

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Clive P. Bosnyak, et al.
U.S. Patent No.: 10,608,282 Attorney Docket No. 18768-0210IP8
Issue Date: Mar. 31, 2020
Appl. Serial No.: 15/881,071
Filing Date: Jan. 26, 2018
Title: BINDERS, ELECTROLYTES AND SEPARATOR FILMS FOR
ENERGY STORAGE AND COLLECTION DEVICES USING
DISCRETE CARBON NANOTUBES

DECLARATION OF SAMUEL P. GIDO

TABLE OF CONTENTS

I.	QUALIFICATIONS AND BACKGROUND INFORMATION.....	1
	A. Educational Background.....	1
	B. Professional Experience.....	2
II.	OVERVIEW OF CONCLUSIONS FORMED.....	9
III.	LEVEL OF ORDINARY SKILL IN THE ART	10
IV.	SUMMARY OF THE '282 PATENT	11
	A. Overview of the '282 Patent	11
V.	PRIOR ART ANALYSIS.....	12
	A. [GROUND 1A] – CLAIMS 1-16 ARE OBVIOUS OVER BOSNYAK- 392 AND SON	12
	1. Overview of Bosnyak-392	12
	2. Overview of Son.....	14
	3. The Bosnyak-392-Son Combination.....	17
	4. Claim-by-Claim Analysis.....	20
	B. [GROUND 1B] – CLAIM 4 IS OBVIOUS OVER BOSNYAI-392, SON, AND SO	60
	C. [GROUND 1C] – CLAIM 11 IS OBVIOUS OVER BOSNYAI-392, SON, AND GU	62
	D. [GROUND 2A] – CLAIMS 1, 5-9, AND 12-16 ARE OBVIOUS OVER BOSNYAK-129 AND ALBUERNE.....	63
	1. Overview of Bosnyak-129	63
	2. Overview of Albuerne	64
	3. The Bosnyak-129-Albuerne Combination	66
	4. Claim-by-Claim Analysis.....	69
	E. [GROUND 2B] – CLAIMS 2-4 AND 10-11 ARE OBVIOUS OVER BOSNYAK-129 IN VIEW OF ALBUERNE AND GU	86
	1. Overview of Gu	86
	2. The Bosnyak-129-Albuerne-Gu Combination	87
	3. Claim-by-Claim Analysis.....	88
VI.	LEGAL PRINCIPLES	94
	A. Anticipation.....	94
	B. Obviousness	95
VII.	ADDITIONAL REMARKS.....	97

I, Samuel P. Gido, declare the following:

I. QUALIFICATIONS AND BACKGROUND INFORMATION

1. My education and experience are described more fully in my curriculum vitae. *See* LGES-1004. For ease of reference, I have highlighted certain information below.

A. Educational Background

2. I first became interested in polymers as an undergraduate student in chemical engineering at Princeton University. At Princeton I took an introductory polymer course, an advanced undergraduate polymer course, and a graduate level polymer course. I did research for my bachelor's thesis at the Textile Research Institute, a nearby independent research lab associated with Princeton, on coating processes for porous polymeric materials. I received my BSE (bachelor of science in engineering) degree in chemical engineering, with high honors (*magna cum laude*) from Princeton in 1988.
3. From there I moved on to the Massachusetts Institute of Technology (MIT) for a doctoral program in chemical engineering. At MIT, I also participated in the interdisciplinary Program in Polymer Science and Technology (PPST, which has been renamed the Program in Polymers and Soft Matter (PPSM), <http://polymerscience.mit.edu/>). This program required that, in addition to

my normal chemical engineering curriculum, I take two semesters of graduate level polymer courses encompassing polymer synthesis, polymer processing, polymer composites, polymer characterization, and polymer properties testing. I did my doctoral research under Prof. Edwin L. Thomas, who was in the Materials Science and Engineering Department at MIT. Prof. Thomas is a world renowned expert in the study of polymer structure using electron microscopy. Therefore, my training and research experience at MIT focused on the use of electron microscopy, SEM and TEM, to study a range of different types of polymers including plastics, rubbers, thermosets, and polymer composites with added fillers. I received my Ph.D. in 1993,

B. Professional Experience

4. After my Ph.D., I moved on to begin my career as a professor in the Polymer Science and Engineering Department at the University of Massachusetts at Amherst. Over my academic career I have received millions of dollars of research funding from government (U.S. Army, National Science Foundation, U.S. Department of Education), foundations (Bill and Melinda Gates Foundation, W. M. Keck Foundation), and industry.
5. I have focused on a bottom-up concept of new materials design for advanced applications. In particular, I have worked on development of new molecular structures for the control of nanometer and micrometer length scale structure

and morphology, directed toward improving properties such as: mechanical strength, rubber elasticity, transport (diffusion) of gases and liquids in porous materials, electrical and magnetic properties, and adhesion. A large part of this research is on controlling the phase separation behavior of materials to form unique, functional structures. In my research I use electron microscopy (SEM and TEM), X-ray scattering, Atomic Force Microscopy (AFM), mechanical (tensile) testing, diffusion studies, and electrochemical cell studies to characterize the properties of new polymeric and composite materials.

6. I have nearly 100 peer reviewed publications and 14 issued patents (11 US, 1 EU, 2 Chinese), including numerous publications on elastomers, thermosets, fluoropolymers including fluoroelastomers, and polymer materials with inorganic fillers. I am an inventor on US Patent 7,619,036, which teaches novel molecular structures and properties for fluoropolymers and fluoroelastomers.
7. I have done research on materials for batteries and fuel cells, including fluorinated polymers and polymer composites containing carbon nanotubes as well as other inorganic fillers. This work was funded by Kureaha (Japan), and the U.S. Army. In these studies, we developed polymer chemistries, nanometer and micrometer scale composite structures, porous structures, and

coating processes. I was the director of a 5 year, \$3.75M Collaborative Research Center between the University and the U.S. Army Research Laboratory on Flexible Protective Materials to be worn by soldiers. Carbon nanotubes and polymer-carbon nanotube composites contributed unique properties, such as high strength, high modulus and electrical conductivity to materials we developed.

8. Additionally, I have worked and continue to work as a consultant for W. L. Gore, a leading company in fluorinated polymers. I have consulted for industry on the topic of coating processes for polymer-filler composite layers, particularly for Rexam Graphics and Scapa Tape. I was also a co-founder of a startup company, Smart Surfaces LLC, that developed environmentally friendly, non-stick coatings for boats (and other structures in a marine environment) to prevent fouling with marine organisms. These coating use crosslinked silicone rubbers with various additives including inorganic particles and silicone oil plasticizer. Smart Surfaces was sold to FujiFilm in 2006, and I continued to consult for the resultant company: FujiFilm Smart Surfaces LLC.
9. I did a research project for Loctite Corporation in which I used electron microscopy to study crosslinked, adhesive, thermoset polymer layers filled with inorganic reinforcing particles. And I did research for Boston

Scientific, which resulted in a U.S. Patent, on polymer coatings for heart stents, using a number of techniques including electron microscopy. These coatings contained filler particles, a particulate drug, and we studied the diffusion of this drug through the coating layer.

10. One of the best ways to really understand a topic is to teach it to someone else. I have taught and continue to teach topics, relevant to this matter, to our advanced graduate students (doctoral candidates) in the Polymer Science and Engineering Department at the University of Massachusetts at Amherst. In past years I have taught PSE 608 Introduction to Polymer Engineering, which includes topics such as mechanical properties, polymer processing, and composite structures. I have also taught in the past and am currently teaching PSE 602 Polymer Characterization Laboratory, in which the students gain practical laboratory experience with techniques including SEM, X-ray scattering, and mechanical testing. I teach PSE 608 Physical Chemistry of Polymers I and PSE 789 Physical Chemistry of Polymers II. In this sequence of classes, I cover, among other things, phase behavior and phase separations (coagulation), and the theory of X-ray scattering. I also teach PSE 721 Polymer Morphology. This class focuses on nanometer and micrometer size structure in polymers and composites, as well as the use of electron microscopy to study materials structure. In PSE 608 and also in PSE

721, silicone rubbers and silicone composites and dispersions are discussed.

I also teach a seminar class for freshman, FFYS 191POLY The Polymer Age, which focuses on popular and societal impacts of polymers. In this class, I present information on carbon nanotubes, silicones, composites, and materials used in lithium ion batteries.

11. I have been the primary research (thesis) advisor to 21 granted Ph.D.s, three of whom have gone on to become professors in their own right. My other students have gone on to careers at major companies or national laboratories including: 3M, Dow Chemical, Eastman Chemical, General Electric, DuPont, Intel, and the U.S. Army Research Laboratory.
12. I have been retained on behalf of LG Energy Solution, Ltd., to offer technical opinions relating to U.S. Patent No. 10,608,282 (“the ’282 Patent,” LGES-1001) and prior art references related to its subject matter. I have reviewed the ’282 Patent and the following references.
 - LGES-1005: PCT Publication WO 2010/117392 (“Bosnyak-392”)
 - LGES-1006: PCT Publication WO 2011/163129 (“Bosnyak-129”)
 - LGES-1007: Korean Patent Publication KR 10-2010-0086854 (“Son”)
 - LGES-1008: Certified English Translation of Son
 - LGES-1009: “Modification of Multiwall Carbon Nanotubes by *Grafting from* Controlled Polymerization of Styrene: Effect of the Characteristics of the Nanotubes,” J. Albuerne, et al., Journal of

Polymer Science Part B: Polymer Physics, 48(2020), 1035-1046
("Albuerne")

- LGES-1013: Japanese Patent Publication JP 2005-262391 ("So")
- LGES-1014: Certified English Translation of So
- LGES-1016: "Layered and interfacially blended polyelectrolyte multi-walled carbon nanotube composites for enhanced ionic conductivity," X. Gu et al., *Thin Film Solids*, Vol. 520, Issue 6, (January 2012), pp. 1872-1879 ("Gu")

13. I have also reviewed various supporting references, including the following, and other documentation as further noted in my opinions below.

- LGES-1010: U.S. Patent Publication No. 2012/0052363 ("Fleischer")
- LGES-1011: R. Marega, et al., "Cap removal and shortening of double-walled and very-thin multi-walled carbon nanotubes under mild oxidative conditions," *Carbon*, 47 (2009), 675-682, published November 27, 2008 ("Marega")
- LGES-1012: U.S. Patent Publication No. 2008/0192407 ("Lu")
- LGES-1015: U.S. Patent No. 9,896,341 to Noyes ("Noyes")
- LGES-1022: "The effect of carbon nanotube aspect ratio and loading on the elastic modulus of electrospun poly(vinyl alcohol)-carbon nanotube hybrid fibers," K. K. H. Wong et al., *Carbon* 47 (2009) 2571-2578 ("Wong")
- LGES-1023: "Dispersion State and Damage of Carbon Nanotubes and Carbon Nanofibers by Ultrasonic Dispersion: A Review," H. Rennhofer et al., *Nanomaterials* 2021, 11, 1469 ("Rennhofer")
- LGES-1024: "Nanocomposites from styrene-butadiene rubber (SBR) and multiwall carbon nanotubes (MWCNT) part 1: Morphology and rheology," S.K. Pedini et al., *Polymer* 55 (2014) 258-270 ("Peddini")

- LGES-1026: U.S. Patent Application Publication US2009/0242850 (“Park”)

14. Counsel has informed me that I should consider these materials through the lens of a person of ordinary skill in the art related to the '282 Patent at the time of the priority date of the '282 Patent, and I have done so during my review of these materials. At the outset, I noted that the earliest *possible* priority date for the '282 Patent would be June 21, 2012, based on the filing date of the earliest provisional application that the '282 Patent claims priority to. However, Counsel has informed me that the *actual* priority date to which the '282 Patent is entitled priority (“Critical Date”) can be no earlier than June 21, 2013, because that’s the first time that applicant added disclosure regarding to bimodal distribution related to, for instance, limitation [1b]. I have therefore used that Critical Date in my analysis below. However, applying the June 21, 2012 date would not have altered my analysis.
15. I have no financial interest in the parties or in the outcome of this proceeding. I am being compensated for my work as an expert on an hourly basis. My compensation is not dependent on the outcome of these proceedings or the content of my opinions.

16. In writing this declaration, I have considered the following: my own knowledge and experience, *e.g.*, as I discussed above. In addition, I have analyzed various publications and materials, in addition to other materials I cite in my declaration.
17. My opinions, as explained below, are based on my education, experience, and expertise in the fields relating to the '282 Patent. Unless otherwise stated, my testimony below refers to the knowledge of one of ordinary skill in the art as of the Critical Date, or before. Any figures that appear within this document have been prepared with the assistance of Counsel and reflect my understanding of the '282 Patent and the prior art discussed below.

II. OVERVIEW OF CONCLUSIONS FORMED

18. This declaration explains the conclusions that I have formed based on my analysis. To summarize those conclusions, based upon my knowledge and experience and my review of the prior art publications listed above, I believe that:

- Claims 1-16 are obvious over Bosnyak-392 and Son
- Claim 4 is obvious over Bosnyak-392, Son, and So
- Claim 11 is obvious over Bosnyak-392, Son, and Gu
- Claims 1, 5-9, and 12-16 are obvious over Bosnyak-129 and Albuerne

- Claims 2-4 and 10-11 are obvious over Bosnyak-129, Albuerne, and Gu

III. LEVEL OF ORDINARY SKILL IN THE ART

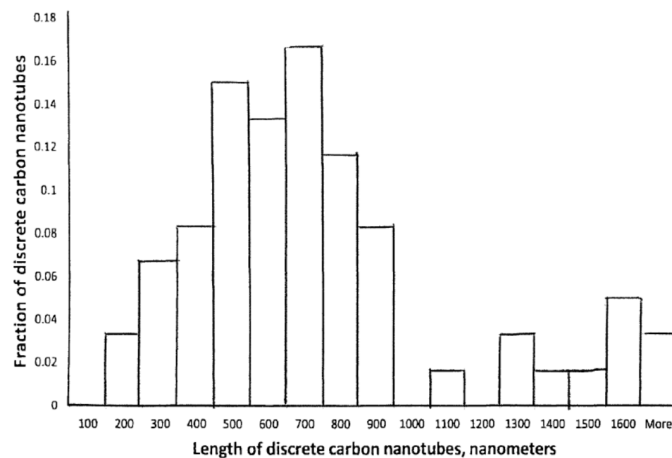
19. In my opinion, one of ordinary skill in the art relating to, and at the time of, the invention of the '282 Patent would have had at least a Master's degree in materials science, chemistry, chemical engineering, a field relevant to polymer science and engineering, or the equivalent, and at least three years of experience in nanomaterials, electrochemistry, batteries, or polymer related activities. Additional work experience can compensate for less formal education, and vice versa.
20. Based on my experiences, I have a good understanding of the capabilities of one of ordinary skill. Indeed, I have participated in organizations and worked closely with many such persons over the course of my career. Based on my knowledge, skill, and experience, I have an understanding of the capabilities of one of ordinary skill.
21. Having undergraduate and graduate degrees in polymer related fields, having taken and taught numerous college level and graduate level polymer classes, and having over 30 years of relevant experience, I meet and exceed the qualifications as a POSITA in this matter.

IV. SUMMARY OF THE '282 PATENT

A. Overview of the '282 Patent

22. The '282 Patent is said to describe “an improved binder composition, electrolyte composition and a separator film composition using discrete carbon nanotubes” that can be used in “energy storage and collection devices, like batteries, capacitors and photovoltaics.” LGES-1001, Abstract, 4:22-26.
23. The '282 Patent also describes the use of “discrete carbon nanotubes” and mentions that they “alternatively termed *exfoliated* carbon nanotubes,” *Id.*, 6:50-57. The '282 Patent further mentions that such nanotubes can be “obtained from as-made bundled carbon nanotubes by methods such as oxidation using a combination of concentrated sulfuric and nitric acids and sonication” and that the “bundled carbon nanotubes can be made from any known means such as, for example, chemical vapor deposition, laser ablation, and high-pressure carbon monoxide synthesis.” *Id.*
24. The '282 Patent also mentions the possibility of having a so-called bimodal distribution in its carbon nanotube distribution, noting that “[i]n statistics, a bimodal distribution is a continuous probability distribution with two different modes.” *Id.*, 5:50-52. An example distribution is shown in FIG. 1 of the '282 Patent, reproduced below, which is said to show discrete carbon

nanotubes having “a bimodal length distribution where the maximum of one peak is about 700 nanometers and the maximum of the second peak is about 1600 nanometers.” *Id.*, 6:18-24.



'282 Patent, FIG. 1

V. PRIOR ART ANALYSIS

A. [GROUND 1A] – CLAIMS 1-16 ARE OBVIOUS OVER BOSNYAK-392 AND SON

25. It is my opinion that a POSITA would have found claims 1-16 to be obvious over Bosnyak-392 and Son, as I discuss in the following sections.

1. Overview of Bosnyak-392

26. Bosnyak-392 describes using “exfoliated carbon nanotubes,” for example in “energy storage devices and polymer composites.” LGES-1005, Abstract, [0037]. Bosnyak-392 describes that “exfoliat[ing] bundles of carbon nanotubes” produces “individualized carbon nanotubes,” which are associated with various benefits. *Id.*, [0003]. Given that two of the three

listed inventors for Boanyak-392 overlaps with the listed inventors for the '282 Patent, it is not at all surprising that both Bosnyak and the '282 Patent use nearly identical terminology when referring to discrete, individualized carbon nanotubes that are used in energy storage applications.

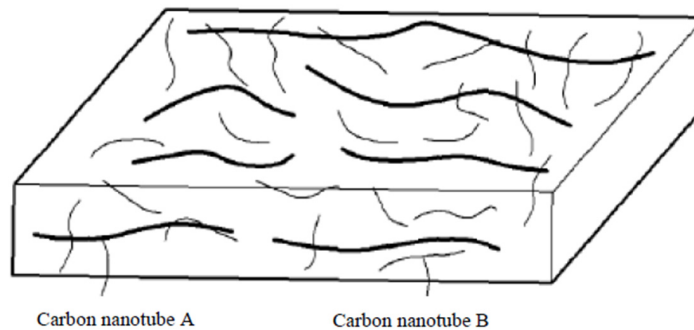
27. Bosnyak-392 also mentions that “exfoliated carbon nanotubes ... take advantage of physical properties offered by individual carbon nanotubes that are not apparent when the carbon nanotubes are aggregated into bundles,” and that such “exfoliated carbon nanotubes may be single-wall carbon nanotubes, double-wall carbon nanotubes, multi-wall carbon nanotubes and various combinations thereof.” *Id.*, [0037]-[0038]. This disclosure is again much aligned with the disclosure of the '282 Patent.
28. Lastly, Bosnyak-392 recognizes that while the techniques it teaches to disperse carbon nanotubes tend to reduce nanotube length, that properties are improved by maintaining some longer carbon nanotubes in the distribution. It therefore recognizes that using both short and long carbon nanotubes at the same time can produce a composite with improved “electrical conduction or mechanical reinforcement” properties. *Id.*, [0073]. This was a well-known concept in battery technology, given that nanotubes with different dimensions can give rise to different benefits that a battery designer may be looking for. It is not a new concept as would be known to a

POSITA. Cathode and anode particles have a range of shapes and some distinct distributions of particle size, which are usually bimodal. By recognizing the benefits of using short and long carbon nanotubes, Bosnyak-392 is by extension recognizing the benefits of using carbon nanotubes of varying aspect ratios at the same time (since varying a nanotube's length is a common way to control its aspect ratio, as evidenced by the '282 Patent itself, among others).

2. Overview of Son

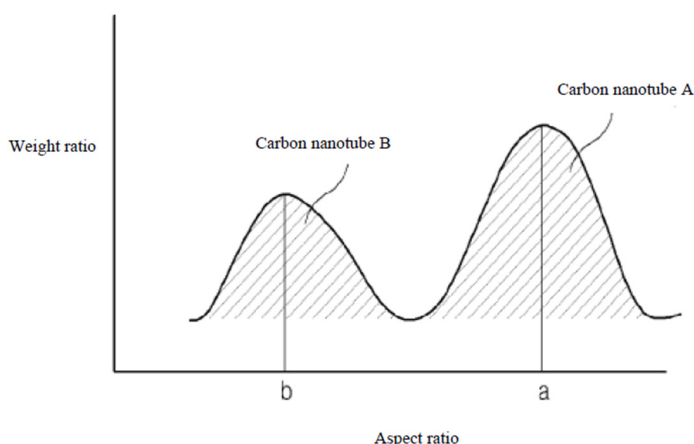
29. Son describes using “a polymer composite material using carbon nanotubes and a method for manufacturing the same.” LGES-1008, [0001]. As can be seen in FIG. 1, reproduced below, Son further describes a polymer composite in which “carbon nanotubes with a large aspect ratio (hereinafter, referred to as carbon nanotube A and second carbon nanotube) and carbon nanotubes with a small aspect ratio (hereinafter referred to as carbon nanotube B and first carbon nanotube) are used together.” *Id.*, [0020].

Thus, similar to Bosnyak-392 and the '282 Patent, Son recognizes the use of carbon nanotubes having a bimodal distribution within a composite material.



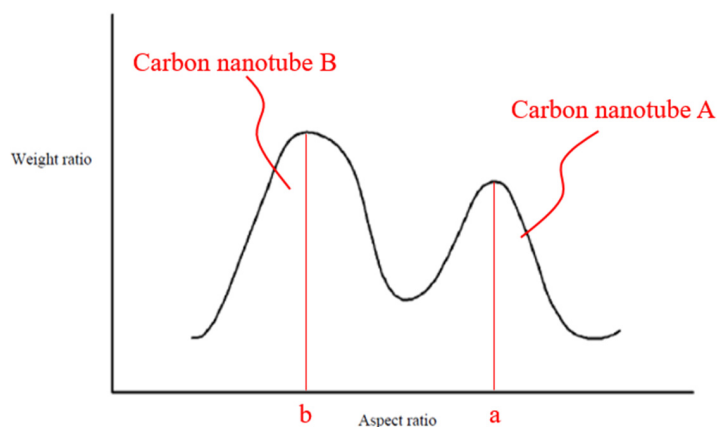
LGES-1008, FIG. 1.

30. Son also discloses that, by using two different types of discrete, individually dispersed carbon nanotubes (*i.e.*, one type having a higher aspect ratio than the other type), electrical and mechanical properties of the composite material can be improved. *Id.*, [0003]-[0005], [0021].
31. Regarding bimodal distribution, as I noted above, Son describes this feature very clearly. For example, with reference to FIG. 4 below, Son discloses that improvements stemming from the use of carbon nanotubes having different aspect ratios can be “achieved by having at least two peaks in a distribution graph of a weight ratio to an aspect ratio of the carbon nanotubes in a polymer composite material comprising carbon nanotubes.” LGES-1008, [0008]. In the example below, a relatively higher percentage of higher aspect ratio carbon nanotubes (“Carbon nanotube A”) can be seen compared to a relatively lower percentage of lower aspect ratio carbon nanotubes (“Carbon nanotube B”).



LGES-1008, FIG. 4.

32. In one of the other various examples, as seen below in FIG. 6, Son similarly discloses having a relatively lower percentage of higher aspect ratio carbon nanotubes (“Carbon nanotube A”) compared to a relatively higher percentage of lower aspect ratio carbon nanotubes (“Carbon nanotube B”).



Son, FIG. 6 (annotated)

3. The Bosnyak-392-Son Combination

33. As I further detail below, it would have been obvious for a POSITA to combine the teachings of Bosnyak-392 and Son. And a POSITA would have been able to do so with a reasonable expectation of success.
34. As for Bosnyak-392, as noted above, it discloses making “energy storage devices and polymer composites” using “exfoliated carbon nanotubes” and further that concurrently using carbon nanotubes having two different aspect ratios can help create composite materials with improved mechanical and electrical properties. LGES-1005, Abstract, [0037], [0073]. While disclosing the notion of using carbon nanotubes having two different aspect ratios for improved properties, Bosnyak-392 does not expressly mention any specific nanotube aspect ratios to use. This is not at all surprising since Bosnyak-392 itself is not a manual/recipe and, understandably, leaves it to a POSITA’s skills and knowledge to fill in such implementation details.
35. Indeed, a POSITA would have considered using the claimed aspect ratio distributions (*i.e.*, “wherein 40% to 90% by number of the discrete carbon nanotubes have an aspect ratio of 30-70 and wherein from 1% to 30% by number of discrete carbon nanotubes have an average aspect ratio 80-140”) in Bosnyak-392 to be obvious and a routine and conventional design choice. In fact, Son provides explicit disclosure for the same.

36. Son, similar to Bosnyak-392 and as noted above, is directed to “a polymer composite material using carbon nanotubes and a method for manufacturing the same” and more specifically describes a polymer composite where “carbon nanotubes with a large aspect ratio (hereinafter, referred to as carbon nanotube A and second carbon nanotube) and carbon nanotubes with a small aspect ratio (hereinafter referred to as carbon nanotube B and first carbon nanotube) are used together.” LGES-1008, [0004], [0020]. FIG. 1. In other words, like Bosnyak-392, Son clearly discloses that using discrete carbon nanotubes with two different aspect ratios at the same time within a single composite material can lead to improved mechanical and electrical properties. Moreover, Son further recognizes that a POSITA would have been more than capable of finding the right aspect ratios to use, explicitly noting that finding the right ratio is a routine/conventional process that can be “easily determined by a person skilled in the art.” LGES-1008, [0033]. Son further goes on to disclose that “[t]he weight ratio of carbon nanotube A/carbon nanotube B may be 0.1 to 10.” LGES-1008, [0032], [0033]; *see also id.*, [0014], [0044]-[0046], Claim 7, FIG. 4. This is a very broad range of possible aspect ratio combinations that covers the claimed limitations of the '282 Patent, for example those of limitation [1b].

37. More specifically, by incorporating the specific aspect ratio distribution teachings of Son's nanotube composite to Bosnyak-392's similarly structured nanotube composite, a POSITA would have recognized that the electrical and mechanical properties of Bosnyak-392's nanocomposite material can be further improved, particularly through the specific bimodal distribution teachings of Son. *See* LGES-1008, [0008], [0021]. That is, while Bosnyak-392 itself does not provide any specific aspect ratio distributions to use, a POSITA would have been able to look to similar teachings found in Son and recognized that the specific examples provided in Son could be used in Bosnyak-392 and further that doing so can lead to improved electrical and/or mechanical properties of the composite found in Bosnyak-392.
38. A POSITA would have been motivated to pursue this implementation of Son's specific bimodal distribution teachings into Bosnyak-392's nanocomposite material as doing so is merely the application of known techniques (using carbon nanotubes having two different aspect ratios in a composite material) to a known structure (composite material containing discrete carbon nanotubes) to yield predictable results (improved electrical and/or mechanical properties). A POSITA would have expected success in this endeavor given that both Bosnyak-392 and Son already describe using

discrete carbon nanotubes having two different aspect ratios for improved electrical/mechanical properties. *See* LGES-1005, [0058]; LGES-1014, [0018]. As such, a POSITA would have been able to combine the teachings of Bosnyak-392 and Son with a reasonable expectation of success.

4. Claim-by-Claim Analysis

(1) Claim 1

[1pre] A composition for use as a binder material, an electrolyte material or a separator film material of an energy storage or collection device, comprising:

39. To the extent the preamble is deemed to be limiting, it is my opinion that the Bosnyak-392-Son combination renders it obvious. Specifically, Bosnyak-392, upon which the Bosnyak-392-Son combination is built, discloses “compositions of exfoliated carbon nanotubes” and is more specifically directed to “improved energy storage devices containing exfoliated carbon nanotubes and . . . batteries having components containing exfoliated carbon nanotubes.” LGES-1005, [0008], [0074]. Bosnyak-392 further discloses “current collectors, electrodes, insulators, electrolytes and separators, each capable of containing exfoliated carbon nanotubes” and more particularly “improved energy storage devices [that] have at least one of at least two electrodes containing exfoliated carbon nanotubes” as well as “improved energy storage devices [that] also include a dielectric medium or electrolyte,

each optionally including carbon nanotubes.” *Id.*; *see also id.*, [0014], Claim 37. Thus, a POSITA would have understood that the composition contemplated in the Bosnyak-392-Son combination is designed for use as a binder material, an electrolyte material or a separator film material of an energy storage or collection device in the manner claimed.

[1a-i]~[ia-iii] a plurality of discrete carbon nanotube fibers, said fibers having an aspect ratio of from about 10 to about 500, and wherein at least a portion of the discrete carbon nanotube fibers are open ended and

40. In the Bosnyak-392-Son combination, Bosnyak-392 describes that “[t]he carbon nanotubes have a length to diameter ratio (aspect ratio) of least about 100 in some embodiments...” LGES-1005, [0042]. This alone meets limitation [1a]. Additionally, Son, whose bimodal nanotube distribution teachings are incorporated into Bosnyak-392’s nanotube composite, describes using two different types of carbon nanotubes where the first nanotube group has an aspect ratio between 10 to 65 and the second nanotube group has an aspect ratio between 130 to 1000. *See* LGES-1008, [0028]-[0029]; *see also id.*, [0009], [0014], [0016], FIG. 4, Claims 2, 7, 9. This results in an overall aspect ratio of about 10 to 1000, which significantly overlaps with the claimed aspect ratio range of “about 10 to about 500.”

41. Considering the “about 10 to about 500” limitation, it should be noted that the ’282 Patent itself provides no discussion or evidence of any unexpected results or criticality associated with nanotubes having an aspect ratio within the claimed range. *See* LGES-1001, 7:48-56. Rather, as noted above, such specifics are mere implementation details that a POSITA would have been able to readily arrive at. In other words, a POSITA would have further considered the use of carbon nanotubes having the disclosed range of aspect ratios to be obvious and a routine and conventional design choice. Nevertheless, both Bosnyak-392 and Son disclose the claimed aspect ratios.
42. The claim here also recites that the nanotubes are “discrete.” As noted above, Bosnyak-392 utilizes “*exfoliated* carbon nanotubes” in order to provide “individual carbon nanotubes” as opposed to those nanotubes that are “aggregated into bundles.” LGES-1005, [0037]; *see also id.*, [0006], [0008], [0036]. In other words, Bosnyak-392 explicitly contemplates using “*separated, exfoliated carbon nanotubes* [that] exist in a disordered but non-aggregated state,” the same as in the ’282 Patent. *Id.*, [0054]. Indeed, the ’282 Patent says that “[i]n the present invention, *discrete oxidized carbon nanotubes, alternatively termed exfoliated carbon nanotubes*” are disclosed.” LGES-1001, 6:50-54. Son similarly relies on the use of discrete nanotubes having “excellent dispersibility.” LGES-1008, [0021]. Thus, in

the Bosnyak-392-Son combination, the carbon nanotubes are not aggregated and are individually distinct in that they lack direct association with one another along substantially the length of the nanotube.

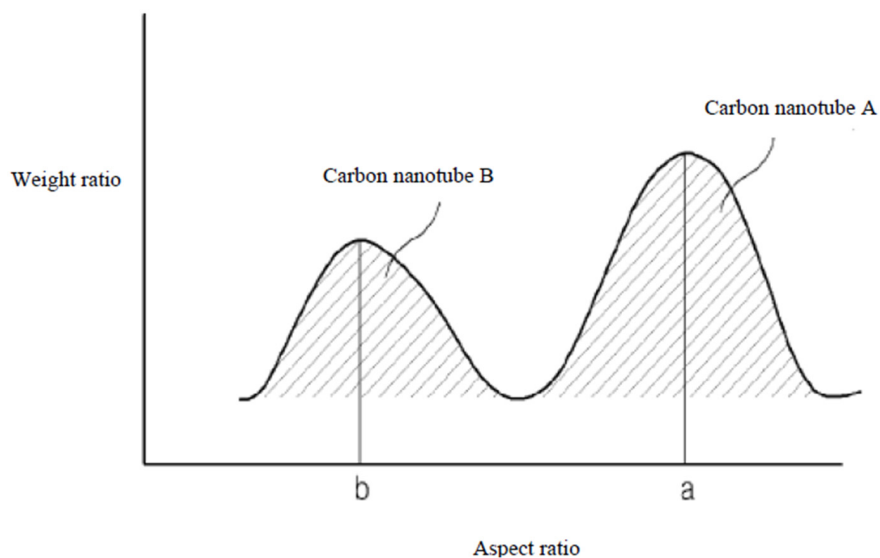
43. The claim also requires the discrete nanotubes to be “open ended.” Here, Bosnyak-392 discloses using “carbon nanotubes that have open ends.” LGES-1005, [0038]. Furthermore, a POSITA would have known well before the Critical Date that carbon nanotubes of the type used in the composites of Bosnyak-392-Son may have either close ends or open ends, depending for instance on the particular manufacturing method used or user preference or both. For instance, by looking to references like Fleischer, a POSITA would have recognized and/or found it obvious that carbon nanotubes can be “capped with a fullerene-like structure” to “have closed ends” or “remain open-ended.” LGES-1010, [0067]. Even for nanotubes that are initially close-ended, it is exceedingly well known that they can be opened through well-recognized oxidizing and other processing methods. *See, e.g.*, LGES-1010, [0067]; LGES-1011, 675-676, 679.
44. For at least these reasons, the Bosnyak-392-Son combination renders obvious this limitation.

[1b] wherein 40% to 90% by number of the discrete carbon nanotubes have an aspect ratio of 30-70 and wherein from 1% to 30% by number of discrete carbon nanotubes have an average aspect ratio 80-140

45. The Bosnyak-392-Son combination renders this limitation obvious. Let me first start by reiterating my point above that there is nothing in the '282 Patent to suggest that this claimed aspect ratio distribution is somehow special in providing "unexpected results." Rather, it's something that a POSITA would have been able to arrive at through routine experimentation, particularly in view of the very similar nanotube types/sizes/aspect ratios that are provided in each of Bosnyak-392 and Son.
46. Additionally, as I described above in laying out the Bosnyak-392-Son combination, a POSITA would have been motivated to incorporate the bimodal aspect ratio distribution of carbon nanotubes, as per Son, into the nanotube composite structure of Bosnyak-392 to, for example, achieve both the "excellent dispersibility" associated with nanotubes "with a small aspect ratio" and the excellent "electrical properties" associated with nanotubes "with a large aspect ratio." LGES-1008, [0008], [0021]. A POSITA would have recognized that Bosnyak-392 itself confirms the desire "[i]n certain applications, particularly those involving electrical conduction or mechanical reinforcement," to incorporate a distribution of lengths (aspect

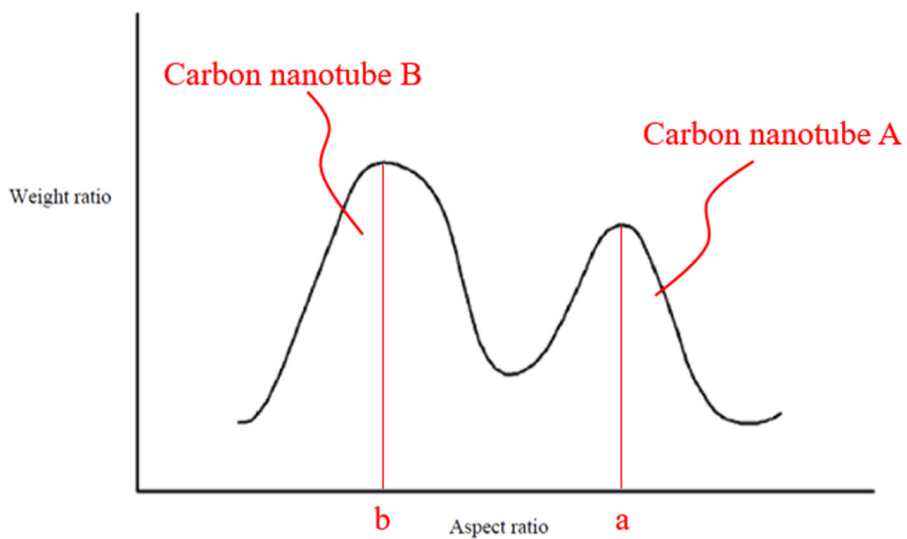
ratios) in its composition that includes ***both shorter and longer carbon nanotubes used together***. LGES-1005, [0073].

47. While Bosnyak-392 does not disclose a particular criteria for selecting the nanotube aspect ratios and their relative percentages—again since it’s not meant to be an instruction manual—Son expressly discloses using two different types of carbon nanotubes (*i.e.*, bimodal distribution) where the first nanotube group (“carbon nanotube B”) has an aspect ratio between 10 to 65 and the second nanotube group (“carbon nanotube A”) has an aspect ratio between 130 to 1000. *See* LGES-1008, [0028]-[0029]; *see also id.*, [0009], [0014], [0016], [0020], Claims 2, 7, 9.
48. For example, Son’s second nanotube group (carbon nanotube A) overlaps with and corresponds to the claimed “discrete carbon nanotubes hav[ing] an aspect ratio of 80-140,” and Son’s first nanotube group (carbon nanotube B) overlaps with and corresponds to the claimed “discrete carbon nanotubes hav[ing] an average aspect ratio 30-70.” An example of Son’s bimodal aspect ratio distribution of its two nanotube groups can be seen in the following distribution graph from Son:



Son, FIG. 4

49. Looking more specifically at FIG. 6 of Son shown below, it is seen that Son, just as in the '282 Patent, discloses having more of the lower aspect ratio nanotubes compared to the higher aspect ratio nanotubes:



Son, FIG. 6 (annotated)

50. As for the details of its bimodal distribution, Son says that finding the right ratio depends on various factors but that it can be “easily determined by a person skilled in the art” and that “[t]he *weight ratio* of carbon nanotube A/carbon nanotube B may be *0.1 to 10*.” LGES-1008, [0032], [0033]; *see also id.*, [0014], [0044]-[0046], Claim 7. This means that you can have ten times more of one group than the other group—and vice versa. This is a very broad range that will certainly cover the particular distribution provided in limitation [1b], even if Son’s ratio is provided as a weight percentage and the claim is written as a number percentage. Significantly, as noted above, Son explicitly discloses having a larger percentage of nanotubes with a smaller aspect ratio and a smaller percentage of carbon nanotubes (CNTs) having a higher aspect ratio, just as claimed in the ’282 Patent.
51. That said, because Son’s nanotubes A and B may not, on a nanotube-by-nanotube basis, necessarily have the same mass, it is possible that there may not be a one-to-one correspondence between weight percentage and number percentage. For example, if each of Son’s nanotubes A are heavier than each of Son’s nanotubes B, the number percentage of nanotubes A will be less than the weight percentage of nanotubes A because, for a given mass of a material, heavier materials will be present in fewer numbers than lighter materials. To show how Son’s comprehensive disclosure further accounts

for this potential lack of a one-to-one correspondence in the distribution data, I provide below three approaches to apply Son's weight percentage to the '282 Patent's number percentage, thereby allowing a more direct comparison between the two. I have included three approaches to converting Son's weight percentage to a number percentage to enable highly reliable comparison of Son to the '282 Patent. All three approaches to converting Son's weight percentage to a number percentage confirm my opinion that Son's embodiments disclose or otherwise render obvious the '282 Patent's claims.

52. **For my first approach**, I will assume that the weight ratio disclosed in Son can be approximated as a number ratio based on a 1:1 conversion. Based on this approximation, having a first group of nanotubes that weighs 10x more than a second group of nanotubes by way of example, would mean that there are 10x more nanotubes in number (*i.e.*, by count) in the first group compared to the second group.
53. A POSITA would have viewed this 1:1 weight to number approximation as being reasonable for various reasons. First, when making a CNT composite, especially for use in energy storage applications, a POSITA would have known to use nanotubes that are not vastly different from one another in terms of size/mass. They would not, for instance, use nanotubes having

dimensions that are orders of magnitude different from one another, as doing so may make it more difficult to form a composite material in which the various types of nanotubes are well dispersed. Moreover, Son provides an explicit basis for this assumption. For example, Son provides two types of aspect ratios: “a number average” aspect ratio and a “weight average” aspect ratio. LGES-1008, [0029]. Critically, Son notes that, regardless of whether a number-based or a weight-based ratio is used, the preferred aspect ratios are “130 to 1000 or 130 to 10,000” for nanotube A and “10 to 65” for nanotube B **under either domain**. *Id.* Accordingly, a POSITA would have recognized that Son does not expect a weight-based aspect ratio distribution to vary significantly from a number-based one. Thus, a POSITA would have understood a 1:1 conversion between weight and number-based domains to be highly reasonable.

54. Based on this 1:1 approximation and based on the “0.1 to 10” weight ratio as noted above, a POSITA would have recognized that Son contemplates having up to 10x more—by number—of high aspect ratio nanotubes compared to the low aspect ratio nanotubes, and vice versa. This is a very wide range that very clearly overlaps with the claimed percentage. For example, looking to Son’s example of having a 3:7 weight ratio between its high aspect ratio nanotubes (carbon nanotube A) and low aspect ratio

nanotubes (carbon nanotube B), this 3:7 weight ratio would translate to a 3:7 number ratio. *See* LGES-1008, Table 1. This means that the high aspect ratio nanotubes in Son would be present at a level of $3/(3+7) = \underline{30\%}$ by number, while the low aspect ratio nanotubes are present at a level of $7/(3+7) = \underline{70\%}$ by number. These number percentage values fall within the claimed “1% to 30% by number” and “40% to 90% by number,” respectively.

55. **For my second approach**, I note that a POSITA would have recognized that Son contemplates changing the aspect ratios of its nanotubes by changing their lengths while keeping their diameters constant. *See* LGES-1008, [0005]. Indeed, a POSITA would have recognized that it is the length of CNTs that are often controlled by the users of CNTs to derive desired properties. In fact, the '282 Patent expressly recognizes such dependence of aspect ratio on length: “Likewise, the lengths of the discrete carbon nanotubes can have a bimodal distribution such that one peak has a maximum value in the range of 150 to 800 nanometers and the second peak has a maximum value in the range 1000 to 3000 nanometers.” LGES-1001, 5:61-65.
56. Referring again to examples provided in Son, in particular to Son’s example of having a 3:7 weight ratio between its high aspect ratio nanotubes (carbon

nanotube A) and low aspect ratio nanotubes (carbon nanotube B), this 3:7 weight ratio can be easily converted into a number ratio. *See* LGES-1008, Table 1. Specifically, Son's Example 3 provides sample aspect ratios of 150 and 50, respectively, for its nanotubes A and nanotubes B. *Id.* [0042].

Assuming an essentially constant average tube diameter among the nanotubes—which a POSITA would reasonably expect to be a likely scenario based on explanations above—the respective amounts of nanotubes A and B in the composition by number would be 12.5% of nanotubes A and 87.5% of nanotubes B. This is because, given that Son's nanotubes A would weigh three times as much as nanotubes B on average (since nanotubes A would be three times as long compared to nanotubes B while having the same diameter), the weight ratios in Example 3 of (3 CNTs A):(7 CNTs B) would translate to a ratio by number of (3/3):(7/1), or 1:7. This means that nanotubes A would be present by number at a level of $1/(1+7) = 12.5\%$. Son's nanotubes B would be present by number at a level of $7/(1+7) = 87.5\%$. Both values fall within the claimed ranges.

57. Taking another example aspect ratio pair that falls within the ranges provided by Son, namely having aspect ratios of 130 and 65, respectively, and performing the same calculations as above based on a contemplated 3:7 weight ratio results in having a number ratio of (3/2):(7/1), or 1.5:7 (dividing

the first value here by 2 instead of 3 as before since the higher aspect ratio nanotube now has twice the mass of the lower aspect ratio nanotubes). This means that nanotubes A would be present by number at a level of $1.5/(1.5+7) = 17.65\%$. Son's nanotubes B would be present by number at a level of $7/(1.5+7) = 82.35\%$. Both values again fall within the claimed ranges and confirm that the contemplated aspect ratio distribution ratios/ranges of Son encompass what is claimed.

58. **For my third approach**, I provide a more mathematically rigorous approach to more precisely go from Son's weight distribution domain to the number distribution domain of the '282 Patent. Not surprisingly, such an approach further validates the reasonable assumptions made in my first and second approaches above.
59. Indeed, number and weight distributions are familiar topics in polymer science. Relative to each other, the weight distribution favors the larger species relative to the number distribution because larger species, being heavier, are counted more heavily in the distribution. Below the mathematical calculations to convert back and forth between weight and number distributions are explained. The results of such calculations depend on the characteristics of the distributions. The following variables are defined:

L = carbon nanotube length

d = carbon nanotube diameter

A = aspect ratio = L/d

$n(A)$ = number of carbon nanotubes having aspect ratio A .

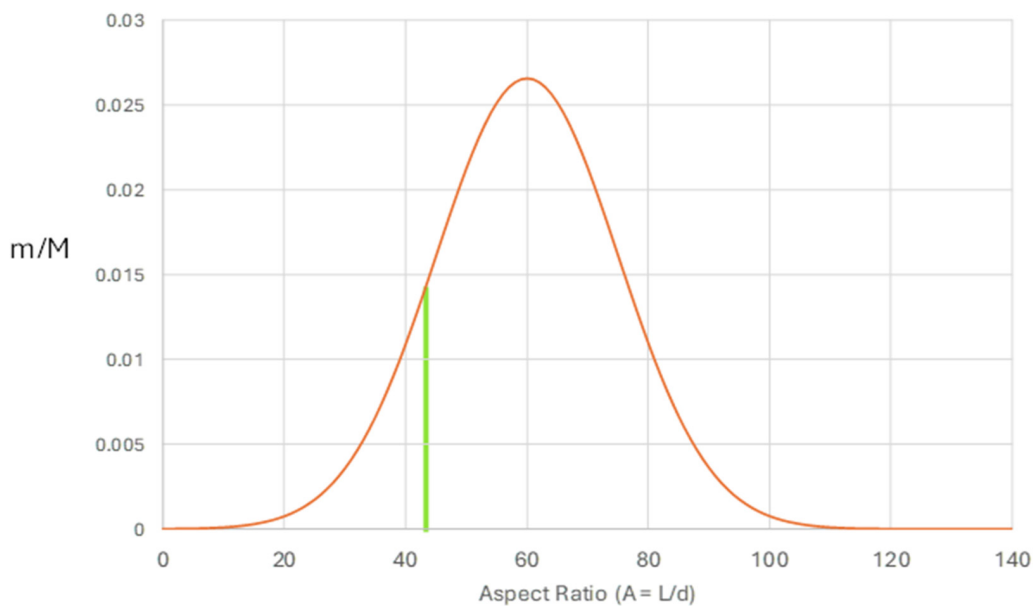
$m_o(A)$ = weight of a single carbon nanotube of aspect ratio A .

$m(A)$ = weight (*i.e.*, mass) of all carbon nanotubes having aspect ratio A .

N = total number of all nanotubes of all aspect ratios

M = total weight (mass) of all nanotubes of all aspect ratios

60. And illustrated below is a simple mass distribution:



61. Here, the vertical axis is the weight fraction of nanotubes at a particular aspect ratio, which is given by m/M . Note that m is a function of A , but the $m(A)$ notation has been simplified when expressing this ratio. This fraction can be converted into a percentage by multiplying by 100%, but it will be more convenient to work with fractions rather than percentages to convert to a number distribution.

62. The vertical green line represents a sliver of the distribution representing a population of nanotubes having a particular aspect ratio A and a particular mass fraction m/M . We want to convert this mass fraction into the number, $n(A)$, of nanotubes having this aspect ratio, A . To do this we need to know the weight, $m_o(A)$, of a single nanotube with aspect ratio A , which is calculated as the density of the nanotube (ρ) times the volume of the nanotube. The volume of a nanotube is its length times its cross-sectional area calculated from its diameter (d):

$$m_o(A) = \rho L \left(\frac{\pi d^2}{4} \right)$$

The weight of all the nanotubes in the slice of the distribution at aspect ratio A , is:

$$m(A) = m_o(A) n(A) = \rho L \left(\frac{\pi d^2}{4} \right) n(A)$$

63. While various densities have been published for carbon nanotubes, it will be seen in the calculations that follow that it does not matter what specific densities are used for the carbon nanotubes because this parameter cancels out of the calculation. Also, there will be likely be a distribution of carbon nanotubes diameters, d , in a population of nanotubes as taught in the patent. There is likely to be a population of multiwalled carbon nanotubes with a

range of diameters. One way to characterize this carbon nanotube diameter distribution is by its average $\langle d \rangle$. If we assume that the distribution of carbon nanotube diameters is similar across the range of aspect ratios (range of lengths) then:

$$m(A) = \rho L \left(\frac{\pi \langle d \rangle^2}{4} \right) n(A) = \rho \left(\frac{\pi (L/d) \langle d \rangle^3}{4} \right) n(A) = \rho \left(\frac{\pi A \langle d \rangle^3}{4} \right) n(A)$$

64. The carbon nanotube diameter distribution, as represented by its average, will be seen to cancel out of the calculation. The total weight of all the nanotubes in the distribution is calculated as follows:

$$M = \int_0^\infty m(A) dA = \int_0^\infty \rho \left(\frac{\pi A \langle d \rangle^3}{4} \right) n(A) dA$$

65. The number of nanotubes, n , at a particular aspect ratio (A) is calculated by dividing the amount in the weight distribution (m/M) by the weight m_o of the nanotube at A and multiplying by the weight of all the nanotubes in the distribution, M :

$$\begin{aligned} n &= \left(\frac{m}{M} \right) \left(\frac{M}{m_o} \right) = \left(\frac{m}{M} \right) \frac{\int_0^\infty \rho \left(\frac{\pi A \langle d \rangle^3}{4} \right) n(A) dA}{\rho \left(\frac{\pi A \langle d \rangle^3}{4} \right)} \\ &= \left(\frac{m}{M} \right) \frac{\rho \left(\frac{\pi \langle d \rangle^3}{4} \right) \int_0^\infty n(A) A dA}{\rho \left(\frac{\pi \langle d \rangle^3}{4} \right) A} = \left(\frac{m}{M} \right) \frac{\int_0^\infty n(A) A dA}{A} \end{aligned}$$

66. The distribution above is a distribution of the absolute number of nanotubes.

To convert it to a fractional (normalized) distribution we need to divide by the total number of nanotubes to get (n/N) , where:

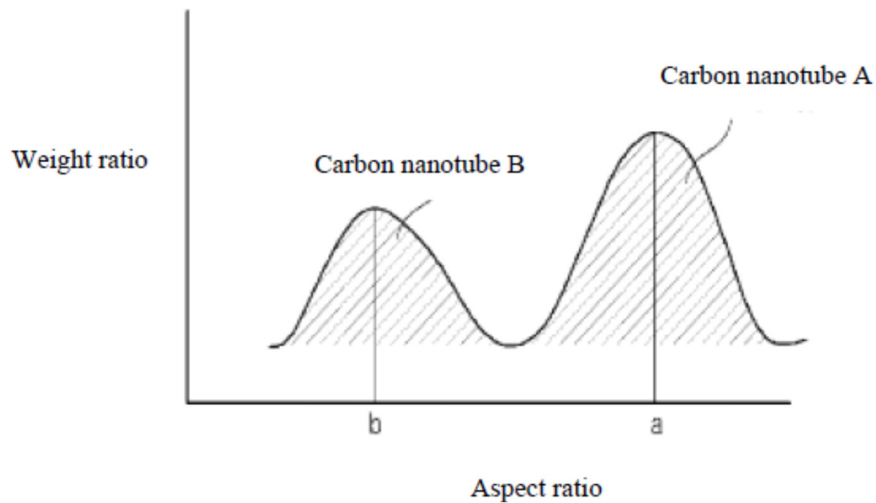
$$N = \int_0^{\infty} n(A) dA$$

67. Therefore, the following two formulas allow the conversion of a known number distribution (n/N) into the corresponding weight distribution (m/M) , or a known weight distribution into a number distribution, respectively.

$$\left(\frac{m}{M}\right) = \left(\frac{n}{N}\right) A \frac{\int_0^{\infty} n(A) dA}{\int_0^{\infty} n(A) A dA}$$

$$\left(\frac{n}{N}\right) = \left(\frac{m}{M}\right) \left(\frac{1}{A}\right) \frac{\int_0^{\infty} m(A) dA}{\int_0^{\infty} \left(\frac{m(A)}{A}\right) dA}$$

68. As noted above, Son teaches a bimodal distribution of carbon nanotubes, and further that the proportion by weight of carbon nanotubes in the first of these peaks to the second varies between 0.1 and 10. LGES-1008, Claims 7, 9.



Son, FIG. 4

69. While Son teaches a bimodal distribution, and sketches two peaks, it does not say what the functional form of the peaks are. A POSITA would have understood that the properties of the composite are influenced not just by the locations of the bimodal peaks, but also by their shapes. Therefore, the POSITA would have been motivated to understand the shape of the distribution peaks in Son's bimodal distribution and would have looked to references such as Wong and Rennhofer for teachings on the shape of the distribution of carbon nanotube aspect ratios in a distribution peak. Indeed, as illustrated below, various references such as Wong and Rennhofer show that dispersed carbon nanotubes have a lognormal distribution of lengths and therefore aspect ratios. *See*, LGES-1022, 6-7, Fig. 7; *see also* LGES-1023, 14.

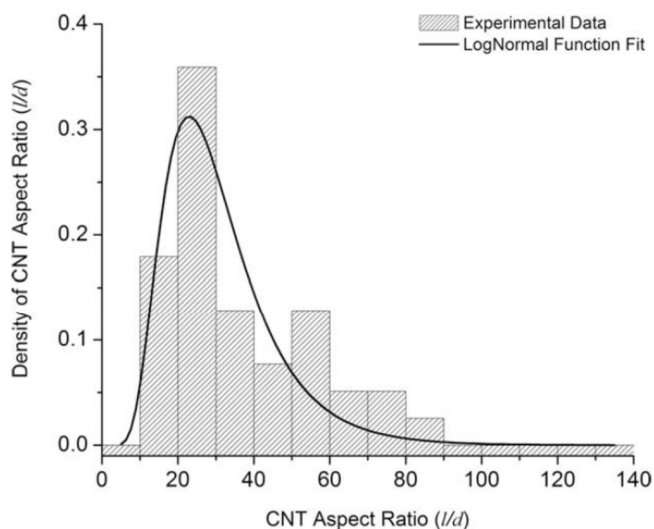
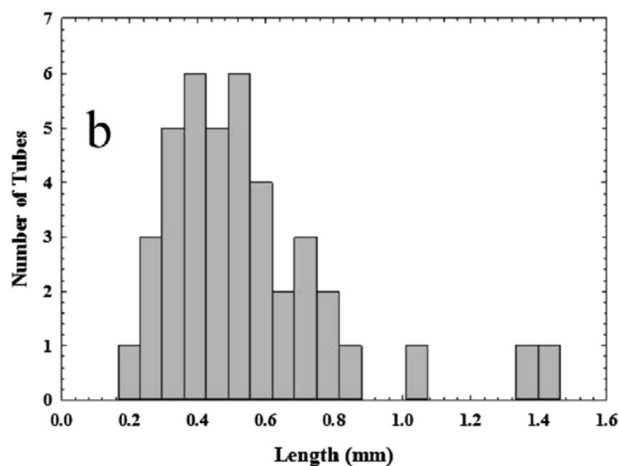


Fig. 7 – A plot of CNT aspect ratio distribution with lognormal distribution function fit.

Wong, Fig. 7

70. Moreover, the type of acid oxidation process for carbon nanotube exfoliation taught in the '282 Patent has been shown to produce a distribution of lengths (and thus aspect ratios) with characteristics of a lognormal distribution, which includes a peak at lower values with a long tail of the distribution at higher values. *See* LGES-1014, Fig. 5(b).



Peddini, Fig. 5(b)

71. A lognormal distribution of a variable x is given by the following formula:

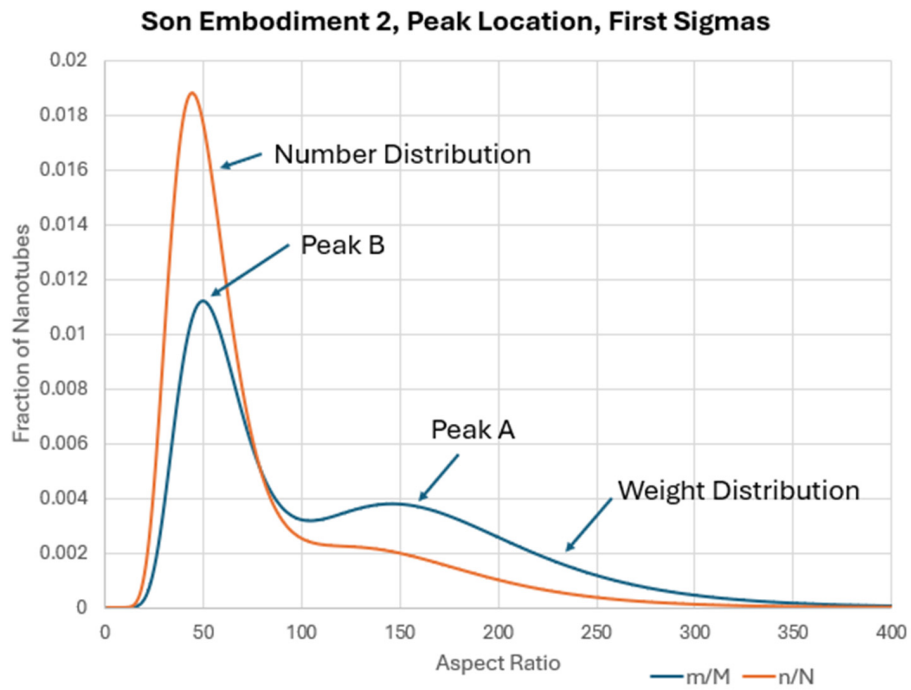
$$f(x) = \frac{1}{x\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{\ln(x)-\mu}{\sigma}\right)^2}$$

where σ is a parameter characteristic of the breadth of the distribution and μ is a parameter that determines the location of the peak. Unlike a normal (Gaussian) distribution, σ is not the standard deviation of the distribution and μ is not the location of the peak. Also note that in a lognormal distribution, the peak maximum (what Son refers to as the vertex) is not the average of the distribution. The average of a lognormal distribution generally occurs at a value higher than the peak of the distribution. Wong reports that the σ parameter has values in the range of 0.34 to 0.81 for lognormal weight distributions of carbon nanotube aspect ratios. LGES-1022, 6.

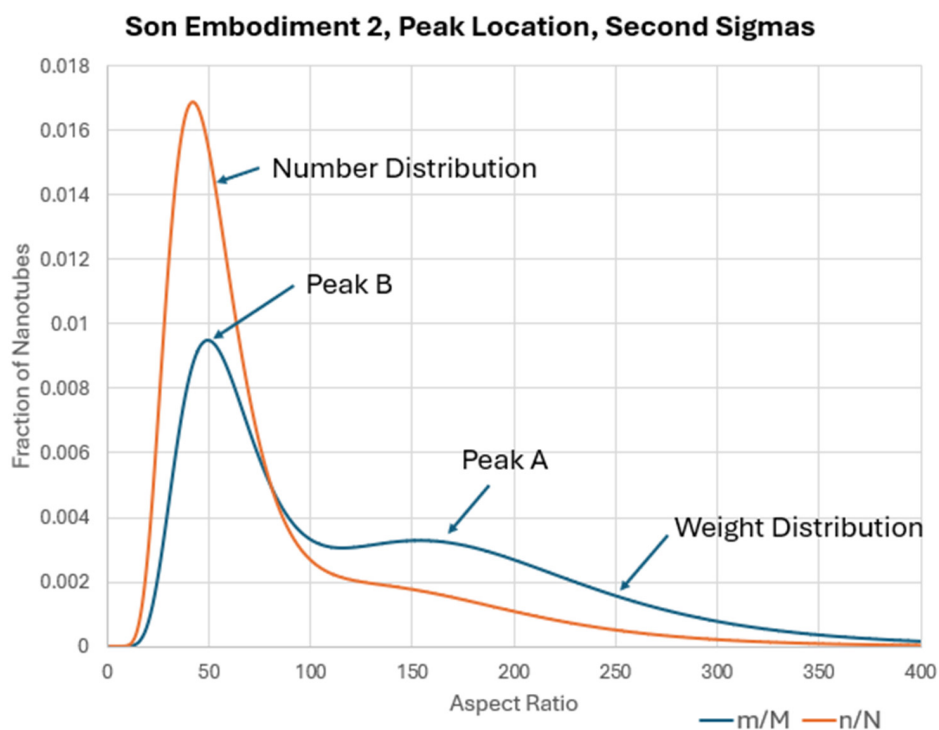
72. Son's Embodiments 2 and 3, when their weight distributions are converted into number distributions, satisfy the aspect ratio elements of claim 1 of the '282 patent. In claim 2 of Son, the aspect ratio is specified in terms of the "vertex" of the peak, in the English translation. The meaning of this is unambiguously the highest point, or peak of the distribution. However, in

describing the experimental embodiments, Son specifies “an average aspect ratio” for nanotubes A and B. LGES-1008, [0042]. As stated above, for a lognormal distribution the average value is not the peak value, although they are generally not dramatically different.

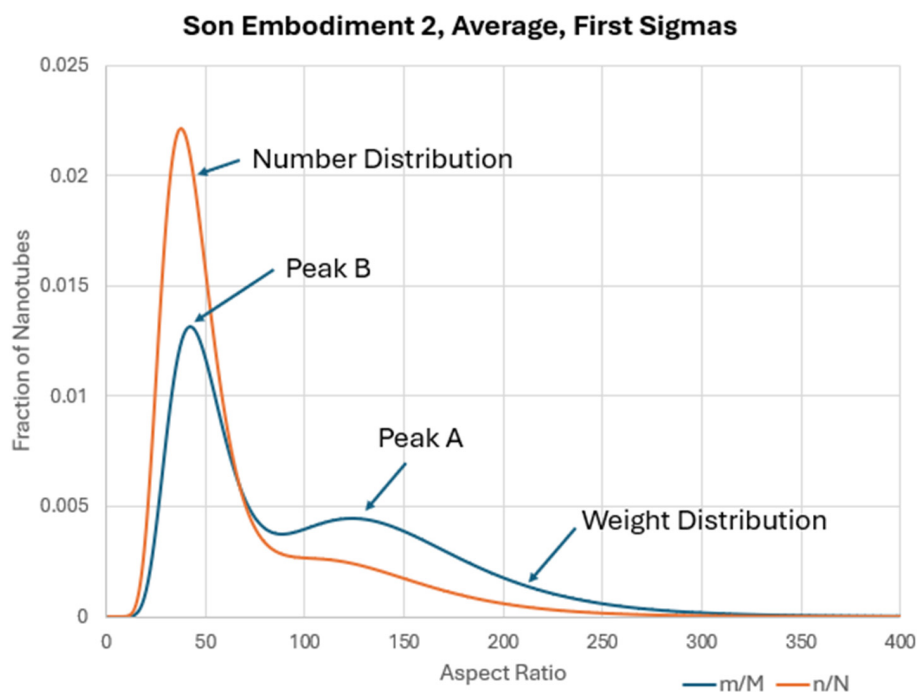
73. In order to show that Son’s embodiments satisfy limitation [1b], multiple cases were calculated in which either the peak or the average of the A and B carbon nanotube distributions matched the aspect ratios specified in Son. The cases investigated are described below, and also include some variation of the σ parameter of the lognormal distribution, within the range taught by Wong 2009. Further details used to create the graphs below are provided in Appendix A.
74. **Son Embodiment 2, Peak Criteria, First set of Sigmas (Son Em 2 Pk sig 1)**: Son Embodiment 2 ratio of peaks, by weight of (5/5). Locations of Peaks A and B are with their vertices (maximums) at 150 and 50 respectively. First set of σ values chosen from range taught by Wong.



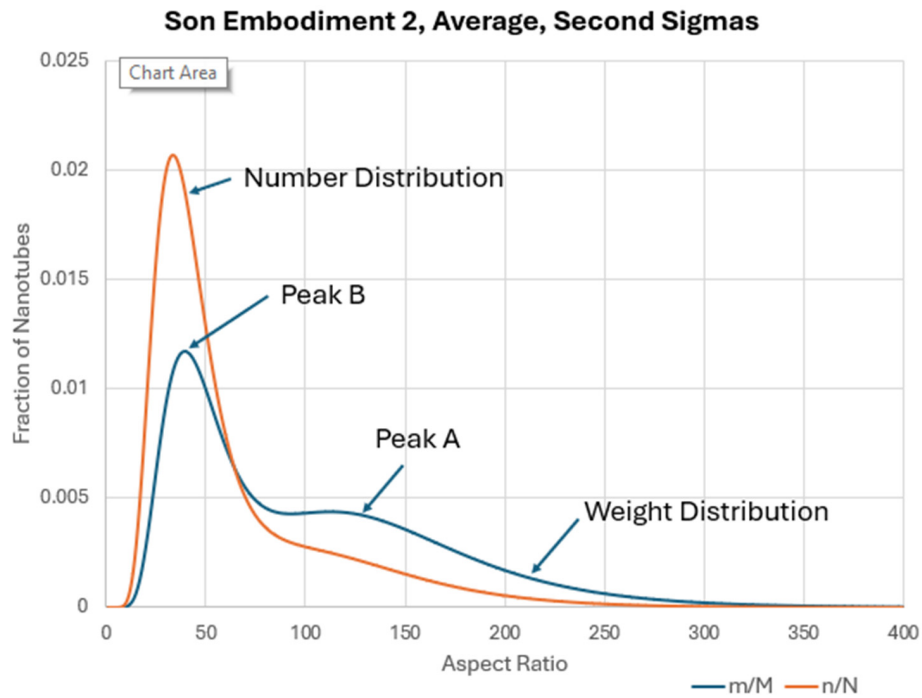
75. **Son Embodiment 2, Peak Criteria, Second set of Sigmas (Son Em 2 Pk sig 2)**: Son Embodiment 2 ratio of peaks, by weight of (5/5). Locations of Peaks A and B are with their vertices (maximums) at 150 and 50 respectively. Second set of σ values chosen from range taught by Wong.



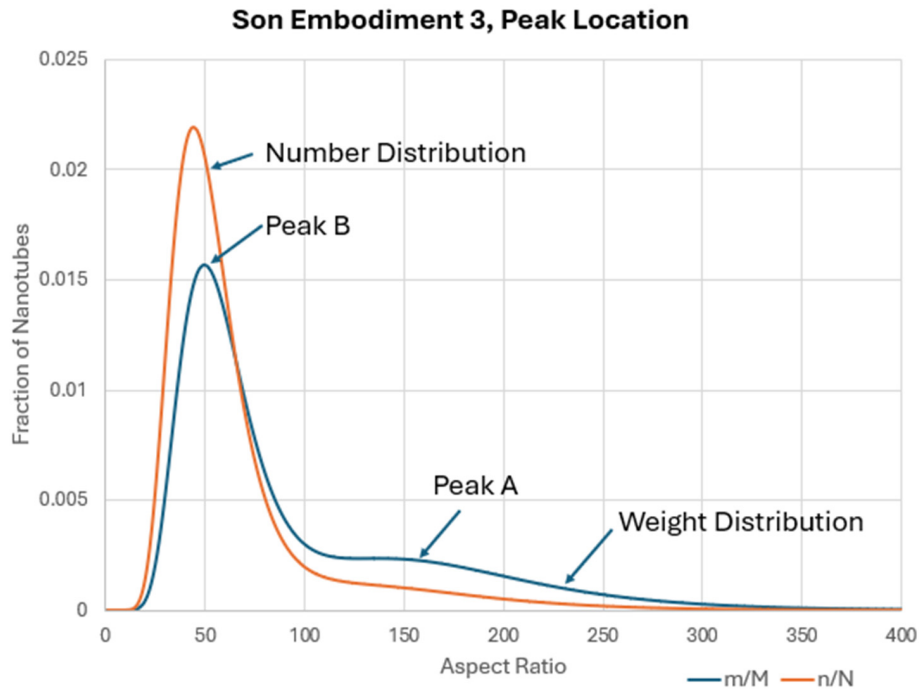
76. **Son Embodiment 2, Average Criteria, First set of Sigmas (Son Em 2 Av sig 1)**: Son Embodiment 2 ratio of peaks, by weight of (5/5). Locations of Peaks A and B are such that their average aspect ratio values are 150 and 50 respectively. First set of σ values chosen from range taught by Wong.



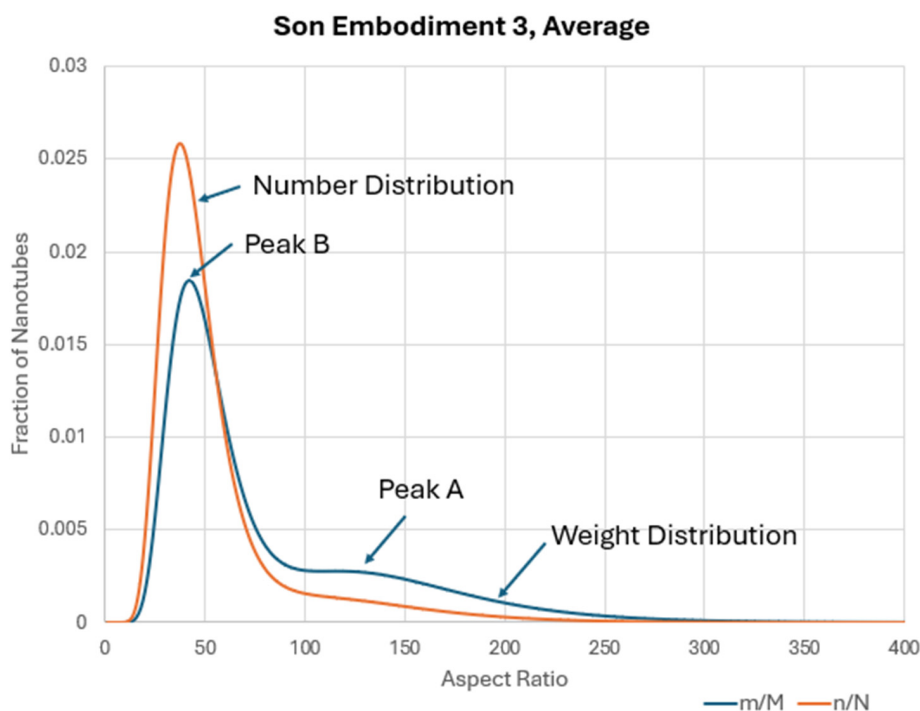
77. **Son Embodiment 2, Average Criteria, First set of Sigmas (Son Em 2 Av sig 2)**: Son Embodiment 2 ratio of peaks, by weight of (5/5). Locations of Peaks A and B are such that their average aspect ratio values are 150 and 50 respectively. Second set of σ values chosen from range taught by Wong.



78. **Son Embodiment 3, Peak Criteria (Son Em 3 Pk):** Son Embodiment 3 ratio of peaks, by weight of (3/7). Locations of Peaks A and B are with their vertices (maximums) at 150 and 50 respectively. σ values chosen from range taught by Wong.



79. **Son Embodiment 3, Average Criteria (Son Em 3 Av):** Son Embodiment 3 ratio of peaks, by weight of (3/7). Locations of Peaks A and B are such that their average aspect ratio values are 150 and 50 respectively. σ values chosen from range taught by Wong.



80. Details of the values of the distribution parameters and comparison to the aspect ratio limitations of the '282 Patent, when the weight-based Son distributions are converted into number distributions, are summarized in the table below. As can be seen, all of the cases of Son's Embodiments 2 and 3, when converted from weight distributions to number distributions satisfy the aspect ratio limitations of the '282 Patent. Looking at "Son Em 3 Pk," for instance, it can be seen that Embodiment 3 of Son corresponds to 69.4% of its nanotubes having an aspect ratio of 30-70 and 11.4% of its nanotubes having an aspect ratio of 80-140, which fall squarely within the claimed ranges of 40-90% and 1-30%, respectively, of the '282 Patent.

	Son Em 2 Pk sig1	Son Em 2 Pk sig2	Son Em 2 Av sig1	Son Em 2 Av sig2	Son Em 3 Pk	Son Em 3 Av
Ratio of Peak A to B	(5/5)	(5/5)	(5/5)	(5/5)	(3/7)	(3/7)
Peak A location (vertex L/d)	150	150			150	
Peak B location (vertex L/d)	50	50			50	
Peak A Average L/d			150	150		150
Peak B Average L/d			50	50		50
μ (Peak A)	5.14	5.21	4.95	4.94	5.17	4.95
σ (Peak A)	0.34	0.37	0.34	0.37	0.34	0.34
μ (Peak B)	4.02	4.06	3.86	3.83	4.02	3.86
σ (Peak B)	0.34	0.40	0.34	0.40	0.34	0.34
Number distribution Aspect ratio:						
30-70	59.6%	54.8%	60.2%	53.9%	69.4%	69.5%
40-60	35.5%	31.1%	32.7%	27.5%	41.3%	37.9%
80-140	15.5%	16.6%	15.7%	15.8%	11.4%	9.4%
90-120	7.4%	8.2%	8.2%	8.3%	5.3%	4.7%

81. For at least these reasons, the Bosnyak-392-Son combination renders obvious this limitation.

b) Claim 2

[2] The composition of claim 1, wherein the portion of discrete carbon nanotubes that are open ended are ion conducting.

82. As I noted above for [1a], Bosnyak-392 discloses the use of open-ended nanotubes. Bosnyak-392 further discloses that its battery, which can include exfoliated carbon nanotubes in its electrodes, electrolyte, and/or separator, allows ions to freely flow between the electrodes (via the electrolyte and separator). *See* LGES-1005, [0076]-[0077]. This means that the open ended carbon nanotubes of Bosnyak-392, which are incorporated into the battery materials, are ion conducting. In fact, such ion conducting properties of carbon nanotubes, in particular those that are open ended as in Bosnyak-392, were well known to a POSITA well before the Critical Date. *See, e.g.*, LGES-1012, [0013], [0017], [0034], [0227].

83. The fact that open-ended carbon nanotubes, as those used in Bosnyak-392, are ion conducting was well-known to a POSITA. As one example, Gu (Exhibit 1016) further recognizes that carbon nanotubes incorporated into battery materials can be ion-conducting, expressly recognizing that “Li diffusion to the interior of SWNTs occurred through open ends” and that “blended film structure of incorporated MWNT may provide a pathway for both improved ion transfer through the polymer matrix and intra-MWNT ion transport.” LGES-1016, 7, FIG. 5. Thus, a POSITA would have recognized that open ended carbon nanotubes are commonly used in battery applications and further that they are ion-conducting. For at least these reasons, the Bosnyak-392-Son combination renders obvious this limitation.

c) Claim 3

[3] The composition of claim 2, further comprising additional inorganic structures comprising elements of the groups two through fourteen of the Periodic Table of Elements.

84. Bosnyak-392 describes that the exfoliated carbon nanotubes used in its composite materials “may be further associated or functionalized with an electroactive material” such as “transition metals or oxides of transition metals such as, for example, Ru, Ir, W, Mo, Mn, Ni and Co.” LGES-1005, [0034]. These examples are certainly inorganic structures/elements found in

groups two through fourteen of the periodic table. Bosnyak-392 also discloses that its “carbon nanotubes may also be modified within the spirit and scope of the disclosure to substitute other tubular nanostructures, including, for example, inorganic or mineral nanotubes” such as “silicon nanotubes, boron nitride nanotubes and carbon nanotubes having heteroatom substitution in the nanotube structure.” LGES-1005, [0034]. These examples also correspond to inorganic structures/elements found in groups two through fourteen of the periodic table. Thus, the Bosnyak-392-Son combination renders obvious this limitation.

d) Claim 4

[4] The composition of claim 2, further comprising non-fiber carbon structures selected from the group consisting of carbon black, graphite, graphene, oxidized graphene, fullerenes, and mixtures thereof.

85. Bosnyak-392 describes “using a nanocrystalline material having a crystalline form such as, for example, nanorods, nanoplates, or nanowhiskers, to intersperse between individual carbon nanotubes.” LGES-1005, [0058]. According to Bosnyak-392, such nanocrystalline materials can include “clays, **graphite**, inorganic crystalline materials, organic crystalline materials and various combinations thereof.” *Id.* Bosnyak-392 happens to mention that the residual nanocrystalline materials, such as graphite, can be removed/washed in an optional step; however, a POSITA would have

certainly known that these materials can alternatively be left in place, which Bosnyak-392 does not preclude, to provide a fiber/non-fiber composite having good electrical/mechanical properties. *See id.*, [0056]; *see also* LGES-1006, [0088]; LGES-1014, [0001], [0002], [0010], [0011], [0018], [0021], Fig. 1. Thus, the Bosnyak-392-Son combination renders obvious this limitation.

e) Claim 5

[5] The composition of claim 1, further comprising at least one polymer.

86. Both Bosnyak-392 and Son are clearly directed to the use of carbon nanotubes in a *polymer* composite material. For example, Bosnyak-392 describes mixing the exfoliated carbon nanotubes with a “polymer material” to form a “polymer composite.” LGES-1005, Abstract, [0015], [0089], [0090], Claim 44. Likewise, Son describes forming a “polymer composite comprising carbon nanotubes” by mixing “carbon nanotubes and polymers.” LGES-1008, [0016], [0039]. Thus, the Bosnyak-392-Son combination renders obvious this limitation.

f) Claim 6

[6] The composition of claim 5, wherein the polymer is selected from the group consisting of vinyl polymers, poly(styrene-butadiene), partially or fully hydrogenated poly(styrene butadiene) containing copolymers, functionalized poly(styrene butadiene) copolymers such as carboxylated poly(styrene butadiene), poly(styrene-isoprene), poly(methacrylic acid),

poly(methylmethacrylate), poly(acrylic acid), poly(vinylalcohols), poly(vinylacetates), fluorinated polymers, polyvinylpyrrolidone, conductive polymers, polymers derived from natural sources, polyethers, polyesters, polyurethanes, and polyamides; homopolymers, graft, block or random co- or ter-polymers, and mixtures thereof.

87. Bosnyak-392 describes that its carbon nanotubes can be mixed with various types of polymers including “*conducting polymer* such as, for example, polyaniline, *polyvinylpyrrole* or polyacetylene.” LGES-1005, [0034]. Son similarly describes that the carbon nanotubes can be mixed with various types of polymers including “polyphenylene sulfide, polyphenylene oxide, liquid crystal polymer, *polyamide*, polycarbonate, polyester, polyvinylated fluorine or polyolefin.” LGES-1008, [0039]. Here, polyvinylpyrrole likely refers to polyvinylpyrrolidone. Thus, the Bosnyak-392-Son combination renders obvious this limitation.

g) Claim 7

[7] The composition of claim 1, wherein the carbon nanotubes are further functionalized.

88. The Bosnyak-392-Son combination describes the use of functionalized carbon nanotubes. For example, Bosnyak-392 describes that, in some cases, “the exfoliated carbon nanotubes are further functionalized” and further that “[f]unctionalization may take place either before or after exfoliation.” LGES-1005, [0044]; *see also id.*, [0032]-[0034], [0063]. Incidentally, Son

also describes that its nanotubes may be “prepared through ... functionalization treatment.” LGES-1008, [0018]. More specifically, Son discloses that “[m]ethods of surface modification may comprise normal acid treatment, heat treatment, and functionalization treatment for attaching functional groups such as carboxyl groups, amine groups, and silane groups.” *Id.*, [0024]. For at least these reasons, the Bosnyak-392-Son combination renders obvious this limitation.

h) Claim 8

[8] The composition of claim 1, further comprising at least one dispersion aid.

89. Bosnyak-392 discloses the use of various surfactants to help improve dispersion of the exfoliated carbon nanotubes. *See* LGES-1005, [0049], [0054]. Bosnyak-392 lists various types of surfactants for aiding in the dispersion, including “ionic and non-ionic surfactants, sodium dodecyl sulfate, sodium dodecylbenzene sulfonate, and PLURONICS” as well as “chloroform and toluene” and “other types of molecules such as, for example, cyclodextrins, polysaccharides, polypeptides, water soluble polymers, DNA, nucleic acids, polynucleotides, and polymers such as polyimides and polyvinyl pyrrolidone.” *Id.* A POSITA would have understood such surfactants that aid in dispersion to be dispersion aids. In the Bosnyak-392-Son combination, a POSITA would have known to retain

improved dispersion of the discrete carbon nanotubes by incorporating the dispersion aids as laid out in Bosnyak-392. While a POSITA would have found this feature to be rendered obvious by Son's own disclosure as well, given that Son is interested in using nanotubes that are well dispersed, Bosnyak-392 further supports the obviousness of this feature in the combination.

i) **Claim 9**

[9] The composition of claim 1, further comprising at least a portion of discrete carbon nanotubes interspersed between graphene and/or oxidized graphene plates.

90. Bosnyak-392 describes using “*nanoplates*” that are “*intersperse[d]* between individual carbon nanotubes” to help promote nanotube isolation, which would result in the claimed interspersed configuration. LGES-1005, [0058]. As I explained above for limitation [4], a POSITA would have recognized that such fiber/non-fiber composites can exhibit improved electrical/mechanical properties. *See, e.g.*, LGES-1006, [0088]; LGES-1014, [0001], [0002], [0010], [0011], [0018], [0021], Fig. 1). Bosnyak-392 mentions nanoplate materials such as *clays* and *graphite*. LGES-1006, [0058]. A POSITA would have understood that graphene is an individual layer of the structure that comprises graphite. In fact, the same inventors’

later work— Bosnyak-129—expressly recognizes the use of graphene nanoplates for being interspersed carbon nanotubes. *See* LGES-1006, [0088] (“The nanoplates can be, for example, ... graphene structures ... The nanotube fibers of this invention can disperse between the individual nanoplates.”). Thus, the Bosnyak-392-Son combination renders obvious this limitation.

j) Claim 10

[10] The composition of claim 1, wherein the binder material has an impedance of less than or equal to about one billion ohm-m.

91. First, I note that claim 1, from which claim 10 depends, does not require a “binder material”; rather, it is merely one of several materials for which the claimed composition can supposedly be used. *See* LGES-1001, Claim 1. In fact, as explained above for limitation [1pre], the Bosnyak-392-Son combination discloses a composition for use as not just a binder material but further as an electrolyte material or a separator film material. Thus, claim 10 arguably does not further narrow claim 1.
92. Furthermore, a POSITA would have recognized that the recited “impedance of less than or equal to about one billion ohm-m” is an extremely broad range that is more than likely to be satisfied by any reasonable material where, as in Bosnyak-392-Son, improved conductivity is desired. *See*

LGES-1005, [0073]; LGES-1008, [0007]. Here, I note that the '282 Patent equates "improved electrical conductivity" to "reduced impedance." LGES-1001, 2:26-30. Because conductivity is the inverse of resistivity, impedance as claimed corresponds to resistivity.

93. For example, Bosnyak-129 describes that a matt made of nanotubes can have a conductivity of "at least 0.1 Siemens/cm and as high as 100 Siemens/cm." LGES-1006, [0008]. In view of the inverse relationship between conductivity and impedance, these levels of conductivity correspond to an impedance of 0.0001 ohm-m to 0.1 ohm-m, which is far less than the claims value of one billion ohm-m. Similarly, Noyes lists example resistivities of bi-modal carbon nanotube samples in the vicinity of around 0.3 ohm-cm (which corresponds to 0.003 ohm-m). *See* LGES-1015 35:56-36:20. Such low resistivity/impedance is further aligned with the desire of Bosnyak-392 and Son to improve electrical conductivity through the use carbon nanotubes. *See* LGES-1005, [0073]; LGES-1008, [0007]. Moreover, Bosnyak-392 discloses that exfoliated carbon nanotubes can be used in all aspects of batteries, including "electrodes containing exfoliated carbon nanotubes." LGES-1005, [0073], [0075], [0077]. Because it was well known to a POSITA that electrodes are made using binder to hold the electrode materials together, a POSITA would have recognized that the

exfoliated carbon nanotubes of Bosnyak-392 would be used as a binder material when incorporated into an electrode. *See, e.g.*, LGES-1001, 1:62-2:1, 2:6-14, 2:34-36. Thus, the Bosnyak-392-Son combination renders obvious this limitation.

k) Claim 11

[11] The composition of claim 1, where the electrolyte material or separator film has a charge transfer resistance of less than or equal to about 10 million ohm-m.

94. First, I note that claim 1, from which claim 11 depends, does not require an “electrolyte material or separator film”; rather, these are merely some of the recited materials for which the claimed composition can supposedly be used. *See* LGES-1001, Claim 1. In fact, as explained above for limitations [1pre] and [10], the Bosnyak-392-Son combination discloses a composition for use as not just as an electrolyte material or a separator film material but further as a binder material. Thus, claim 11 arguably does not further narrow claim 1.

95. Furthermore, similar to my explanation above for limitation [10], a POSITA would have recognized that the recited “charge transfer resistance of less than or equal to about 10 million ohm-m” is an extremely broad range that is likely to be satisfied by any material where, as in Bosnyak-392-Son, improved conductivity (*i.e.*, reduced resistivity) is desired. *See* LGES-1005,

[0073]; LGES-1008, [0007]. For example, Gu—similar to Bosnyak-392—describes the use of carbon nanotube in an electrolyte for improved conductivity. LGES-1016, 1872. Moreover, Gu specifically discloses electrolyte materials made with carbon nanotubes where the resulting conductivity ranges from approximately 10^{-6} Siemens/cm to 10^{-5} Siemens/cm. *Id.*, 1875. FIG. 2. In view of the inverse relationship between conductivity and resistance, these conductivity values correspond to a charge transfer resistance of 1000 to 10,000 ohm-m, which is far less than 10 million ohm-m.

96. For at least these reasons, the Bosnyak-392-Son combination renders obvious this limitation.

I) Claim 12

[12] The composition of claim 1, wherein the carbon nanotubes are oriented.

97. Bosnyak-392 describes that “the carbon nanotubes may be further oriented in an alignment step after isolating the exfoliated carbon nanotubes.” LGES-1005, [0048]; *see also id.*, [0068], [0086]. Thus, the Bosnyak-392-Son combination renders obvious this limitation.

m) Claim 13

[13] The composition of claim 12, wherein the orientation is accomplished in a sheet, micro-layer, micro-layer with vertical film orientation, film, molding, extrusion, or fiber spinning fabrication method.

98. Bosnyak-392 describes that “exfoliated carbon nanotubes can be aligned in forming electrodes for use in the energy storage devices” and that such orientation/alignment “may occur through melt *extrusion*.” LGES-1005, [0086]. Bosnyak-392 further describes that the exfoliated carbon nanotubes, which may be oriented/aligned, may further be “shaped into a form such as, for example, a mat, film, fiber, cloth, non-woven fabric or felt.” LGES-1005, [0048]. Thus, the Bosnyak-392-Son combination renders obvious this limitation.

n) Claim 14

[14] The composition of claim 12, wherein orientation includes post fabrication methods, such as tentering, uniaxial orientation, biaxial orientation and thermoforming.

99. Bosnyak-392 describes that orientation can occur in a post-fabrication step “after isolating the exfoliated carbon nanotubes” and further that “the exfoliated carbon nanotubes may also be used in fabrication and assembly techniques including, for example ... thermoforming[.]” LGES-1005, [0048], [0037]. Thus, the Bosnyak-392-Son combination renders obvious this limitation.

o) Claim 15

[15] The composition of claim 1, which further comprises electrolyte.

100. Bosnyak-392 discloses composite materials in which exfoliated carbon nanotubes are mixed electrolyte. *See* LGES-1005, [0074], [0076], [0077]. Bosnyak-392 further discloses that “[o]rganic electrolytes such as, for example tetraethylammonium tetrafluoroborate and tetrabutylammonium tetrafluoroborate, can simultaneously serve as an electrolyte and surfactant for dispersing and exfoliating carbon nanotubes in embodiments where carbon nanotubes are contained in the electrolyte.” LGES-1005, [0081]. Thus, the Bosnyak-392-Son combination renders obvious this limitation.

p) Claim 16

[16] The composition of claim 15, wherein the electrolyte comprises a polymer or a liquid.

101. Bosnyak-392 describes that “the electrolyte of the energy storage devices can be a solid or a fluid,” including “[a]queous electrolytes such as potassium hydroxide or sulfuric acid.” LGES-1005, [0081]. Bosnyak-392 further describes that “electrolytes can be of a polymer-gel type such as, for example, polyurethane-lithium perchlorate, polyvinyl alcohol-KOH-H₂O and the related systems.” *Id.* Thus, the Bosnyak-392-Son combination renders obvious this limitation.

B. [GROUND 1B] – CLAIM 4 IS OBVIOUS OVER BOSNYAK-392, SON, AND SO

102. As I described above, the Bosnyak-392-Son combination renders obvious claim 4’s requirement of “further comprising non-fiber carbon structures selected from the group consisting of carbon black, graphite, graphene, oxidized graphene, fullerenes, and mixtures thereof.” This limitation is further rendered obvious in view of So (LGES-1014).
103. Briefly, So describes a “nanocarbon composite material” having “excellent properties.” LGES-1014, [0018]. So further describes a composite material where “carbon nanotubes or carbon nanofibers . . . are interconnected by carbon to form a three-dimensional network, and the voids in the porous material are impregnated with a resin, rubber, metal, or carbon-based material.” *Id.* According to So, the “carbon” material that helps provide a “strongly bonded” structure can be “selected from among **fullerenes, carbon black**, cut carbon nanofibers, and cut carbon nanotubes[.]” *Id.*; *see also id.*, [0001], [0002], [0010], [0011], [0021], Fig. 1. As a result, “excellent electrical conductivity and mechanical properties” can be imparted to carbon nanotube composite materials. LGES-1014, [0002].
104. In view of these teachings of So, a POSITA would have been motivated to further modify the Bosnyak-392-Son combination *in view of So* to provide, among other things, “excellent electrical conductivity and mechanical

properties” as per So’s teachings. LGES-1014, [0002]. Similar to So, Bosnyak-392 describes using a composite material having discretely dispersed carbon nanotubes to improve electrical and mechanical properties. *See* LGES-1005, [0006], [0087], [0105]. Thus, by incorporating additional carbon-based fillers such as fullerenes and carbon black, as per So, into the nanotube composite of Bosnyak-392 as modified by Son in the manner described for Ground 1A, a POSITA would have recognized that the electrical/mechanical properties of Bosnyak-392-Son’s nanocomposite material can be further improved through enhanced bonding provided by Son’s fillers. LGES-1014, [0009], [0011], [0025].

105. A POSITA would have additionally been prompted to pursue this implementation of Bosnyak-392-Son’s nanocomposite material by including the carbon-based fillers of So as doing so is merely the application of known techniques (*e.g.*, use of carbon-based fillers in a composite material containing discrete carbon nanotubes) to a known structure (*e.g.*, composite material containing discrete carbon nanotubes) to yield predictable results (*e.g.*, improved electrical/mechanical properties). Moreover, a POSITA would have expected success in the Bosnyak-392-Son-So combination given that both Bosnyak-392 and So already describe using carbon-based fillers

among its carbon nanotube structure for improved electrical/mechanical properties. *See* LGES-1005, [0058]; LGES-1014, [0018].

C. [GROUND 1C] – CLAIM 11 IS OBVIOUS OVER BOSNYAK-392, SON, AND GU

106. As I described above, the Bosnyak-392-Son combination renders obvious claim 11. Additionally, a POSITA would have been motivated to combine Bosnyak-392-Son with Gu to further render this claim obvious.
107. For instance, Bosnyak-392 discloses using carbon nanotubes-containing electrolytes and further recognizes the need to increase conductivity (*i.e.*, lower the charge transfer resistance). LGES-1005, [0006], [0034]. While Bosnyak-392 doesn't describe specific ways of making CNT-containing electrolyte to increase conductivity or even what a good target conductivity value would be, Gu provides precisely such details. Indeed, Gu teaches incorporating carbon nanotubes into an electrolyte material for numerous benefits, including increasing ionic conductivity of such electrolytes by up to two orders of magnitude. *See* LGES-1016, 1872. Gu also provides example conductivity (and thus charge transfer resistance) values that a POSITA can aim for in order to achieve "improved" conductivity for lithium-ion battery applications. Thus, a POSITA would have been motivated to incorporate Gu's "PEO/PAA/PEO/(PAA + MWNT) electrolyte" composition and/or looked to emulate Gu's CNT-enabled charge transfer resistance values of

1000~10,000 ohm-m in designing Bosnyak-392-Son's CNT-based electrolyte with improved conductivity. *Id.*, 1875.

D. [GROUND 2A] – CLAIMS 1, 5-9, AND 12-16 ARE OBVIOUS OVER BOSNYAK-129 AND ALBUERNE

108. It is my opinion that a POSITA would have found claims 1, 5-9, and 12-16 to be obvious over Bosnyak-129 and Albuerne, as I discuss in the following sections.

1. Overview of Bosnyak-129

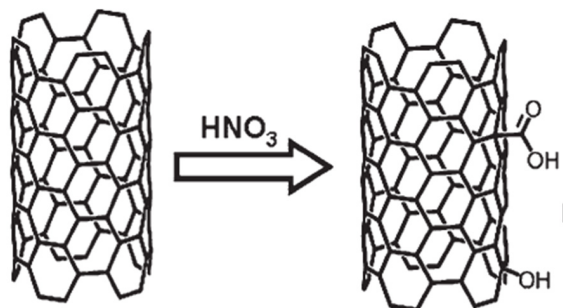
109. Bosnyak-129 describes “exfoliation and dispersion of ... surface-modified carbon nanotubes that are readily dispersed in various media.” LGES-1006, Abstract, [0002]. The nanotubes can be “single wall, double wall or multiwall carbon nanotube fibers” and “can have oxidation species comprising of carboxylic acid or derivative carboxylate groups.” *Id.*, [0007]; *see also id.*, [0064]-[0065]. Bosnyak-129 also describes acid treatments, such as using a sulfuric and nitric acid mixture, that can be performed on its nanotubes. *See* LGES-1006, [0012], [0076], [0154]-[0155]. Incidentally, Bosnyak-129 utilizes the terms “carbon nanotubes” and “carbon nanotube fibers” interchangeably, for instance describing that “a plurality of carbon nanotubes is disclosed comprising single wall, double wall or multiwall carbon nanotube fibers....” *Id.*, [0007], [0064].

110. Bosnyak-129 also describes using its carbon nanotubes for “improved energy storage devices and particularly ... batteries having components containing exfoliated carbon nanotubes” to make “improved energy storage devices [that] include components such as, for example, current collectors, electrodes, insulators, electrolytes and separators containing exfoliated carbon nanotubes.” LGES-1006, [0131]. Specifically, Figure 3 of Bosnyak-129 shows “an illustrative arrangement of the basic elements of a battery.” LGES-1006, [0134]. This battery also includes electrodes 21, 23 and electrolyte 22 (which are actually indicated as electrodes 1, 3 and electrolyte 2 in Figure 3). *Id.* Bosnyak-129 further notes that one or both electrodes as well as the electrolyte can contain “exfoliated nanotubes.” *Id.*

2. Overview of Albuerne

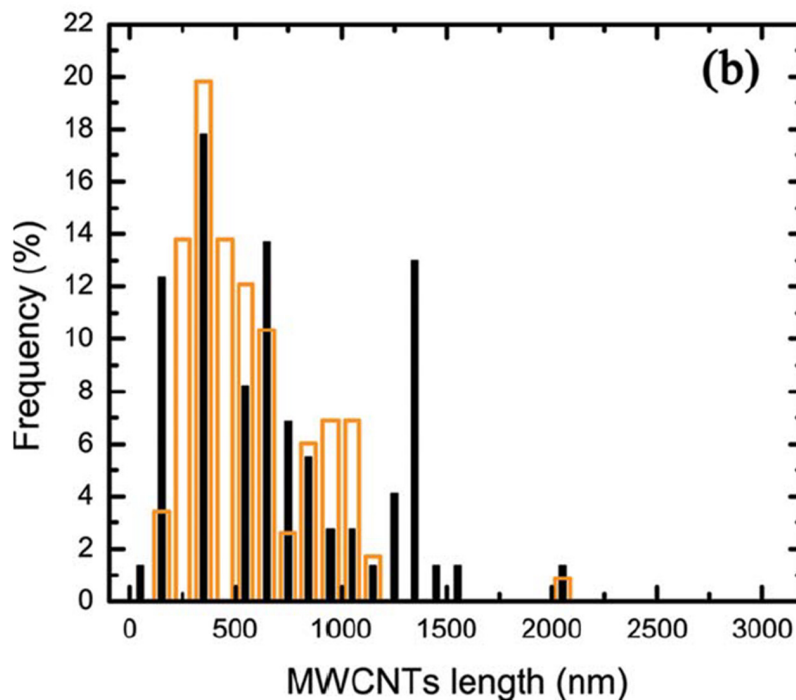
111. Albuerne describes techniques for incorporating commercially available carbon nanotubes into composite materials, namely polymer matrices. LGES-1009, Abstract, 1035. Among other things, Albuerne explains the need to “improve the dispersion of individual carbon nanotubes.” *Id.*, 1035.
112. Part of its overall strategy to form nanotubes-polymer composites, in which the nanotubes are well-dispersed in the polymer, is to first oxidize the commercially available nanotubes. For instance, Albuerne describes an acid treatment step using nitric acid (HNO₃) followed by sonification that forms

carboxylate groups on the sidewalls of commercially available multiwall carbon nanotubes from FutureCarbon GmbH having a mean diameter of 15 nm (denoted as “MWCNT_{FC}⁹⁹”). LGES-1009, 1036. An exemplary oxidation of nanotubes is illustrated below.



Albuerne, Figure 1 (cropped).

113. Of note, Albuerne separated the dispersed nanotubes having the carboxylate groups from those that remain aggregated, and analyzed the length distribution of the dispersed carbon nanotubes using scanning force microscopy (SFM). LGES-1009, 1039-1040. The length distribution for MWCNT_{FC}⁹⁹ nanotubes is shown below outlined in orange.



Albuerne, Figure 5(b)

3. The Bosnyak-129-Albuerne Combination

114. As I further detail below, it would have been obvious for a POSITA to combine the teachings of Bosnyak-129 and Albuerne. And a POSITA would have been able to do so with a reasonable expectation of success.
115. For example, a POSITA would have found it obvious to interchangeably use the nitric acid treatment step discussed in Albuerne as one of the possible “acidic solution” treatments discussed in Bosnyak-129 to achieve the well known and recognized benefit of improving preservation of the carbon nanotubes’ structures and lengths. LGES-1006, [0011]). Such

modification/combination would have been a simple substitution of one known element (e.g., sulfuric and nitric acid solution in Bosnyak-129) for another (e.g., nitric acid solution taught by Albuerne) to obtain the predictable results of obtaining discrete oxidized carbon nanotubes having longer carbon nanotubes. To this end, Bosnyak-129 suggests that the electrical and mechanical properties of a nanotube composition can be improved by avoiding “carbon nanotube damage and shortened carbon nanotube lengths.” LGES-1006, [0130]. A POSITA would have been motivated to apply Bosnyak-129’s through Albuerne’s “chosen acid treatment” using nitric acid that “preserve[s] the carbon nanotubes ... without cutting the length of the carbon nanotubes or lo[]sing any of the walls.” LGES-1009, 1038.

116. Thus, to better preserve Bosnyak-129’s nanotubes, a POSITA would have turned to Albuerne’s teachings and used its nitric acid treatment to obtain Bosnyak-129’s discrete carbon nanotube fibers. This is merely a simple substitution between Bosnyak-129’s and Albuerne’s acid solutions to create exfoliated carbon nanotubes that have carboxylic acid/carboxylate groups. To this end, Bosnyak-129 expressly indicates that “one of ordinary skill in the art can easily ascertain the essential characteristics of this disclosure, and without departing from the spirit and scope thereof, can make various

changes and modifications to adapt the disclosure to various usages and conditions.” LGES-1006, [0160].

117. Alternatively/additionally, it would have been obvious to try to incorporate Albuerne’s acid treatment and discrete oxidized MWCNT_{FC}⁹⁹ into Bosnyak-129’s composition. As described above, a POSITA would have appreciated the well known desire to use carbon nanotubes in a composition with improved dispersion, mechanical, or electrical properties, and would have know about the number of treatment methods identified in Bosnyak-129 and Albuerne.
118. Moreover, a POSITA would have had a reasonable expectation of success in incorporating Albuerne’s teachings into Bosnyak-129’s composition because both references teach oxidizing carbon nanotubes using the similar acid solution and sonication techniques to disperse carbon nanotubes. Additionally, Albuerne merely teaches specific steps for oxidation utilizing specific carbon nanotubes from particular manufacturers (e.g., MWCNT_{FC}⁹⁹ from FutureCarbon GmbH), and thus would have reasonably expected that similar oxidizing treatments can be applied to other nanotubes to yield similar results.

4. Claim-by-Claim Analysis

(1) Claim 1

[1pre] A composition for use as a binder material, an electrolyte material or a separator film material of an energy storage or collection device, comprising:

119. To the extent the preamble is deemed to be limiting, it is my opinion that the Bosnyak-129-Albuerne combinations renders it obvious. Specifically, Bosnyak-129 describes a composition for “improved *energy storage devices [that] include* components such as, for example, current collectors, *electrodes*, insulators, *electrolytes and separators containing exfoliated carbon nanotubes*.” LGES-1006, [0131]. Bosnyak-129 also explains “mix[ing], blend[ing], sonicat[ing], or a combination thereof” its carbon nanotube fibers “with at least other material to form a *material/nanotube fiber composition*.” *Id.*, Claim 33. Bosnyak-129 also generally describes “the exfoliation and dispersion of carbon nanotubes resulting in high aspect ratio, surface-modified carbon nanotubes that are readily dispersed in various media.” *Id.*, [0002]. Bosnyak-129 discloses a carbon nanotube containing composition for use as a binder, electrolyte material, or a separator film material of an energy storage or collection device. *Id.*, [00131]
120. That is to say, Bosnyak-129 is directed to a composition for use as a binder material of an energy storage or collection device. In line with the teachings

of the '282 Patent itself, which acknowledges that electrodes are typically made using binders (*see, e.g.*, LGES-1001, 1:62-2:1, 2:6-11, 2:34-36), Bosnyak-129 explains that its carbon nanotubes may be “associated or functionalized with an electroactive material.” LGES-1006, [0092].

Bosnyak-129 also discloses using exfoliated carbon nanotubes for electrodes (*see e.g.*, LGES-1009, [0134]), something which was well known to be made from a composition comprising a binder material as acknowledged by the '282 Patent. *See* LGES-1001, 1:62-2:1, 2:6-14, 2:34-36. For at least these reasons, Bosnyak-129 teaches a composition with exfoliated carbon nanotubes for use as a binder material.

121. Bosnyak-129 also discloses a composition for use as an electrolyte material of an energy storage or collection device. For instance, Bosnyak-129 provides “improved energy storage devices includ[ing] *electrolytes* ... containing exfoliated carbon nanotubes.” LGES-1006, [0131] (“The improved energy storage devices also include a dielectric medium or *electrolyte*, each optionally including carbon nanotubes.”), [0159] (“Exfoliated carbon nanotube capacitor: The capacitor was prepared as for control 1, except oxidized multi-wall carbon nanotubes were used in place of as- received multi-wall carbon nanotubes [added to the electrolyte mixture].”). Accordingly, the electrolyte of the “improved energy storage

device” is formed using a composition that includes “exfoliated carbon nanotubes.” *Id.*, [0131], [0037] (“In various embodiments, compositions of fully and high aspect ratio exfoliated carbon nanotubes are disclosed herein.”), [0138].

122. Lastly, Bosnyak-129 also discloses a composition for use as a separator film material of an energy storage or collection device. Bosnyak-129 provides “improved energy storage devices includ[ing] ... *separators* containing exfoliated carbon nanotubes.” LGES-1006, [0131] (“The improved energy storage devices also include a *dielectric medium* or electrolyte, each optionally including carbon nanotubes. That is, the separator film of the “improved energy storage device” is formed using a composition that includes “exfoliated carbon nanotubes.” *Id.*, [0131], [0037] (“In various embodiments, compositions of fully and high aspect ratio exfoliated carbon nanotubes are disclosed herein.”), [0138].

[1a-i] a plurality of discrete carbon nanotube fibers,

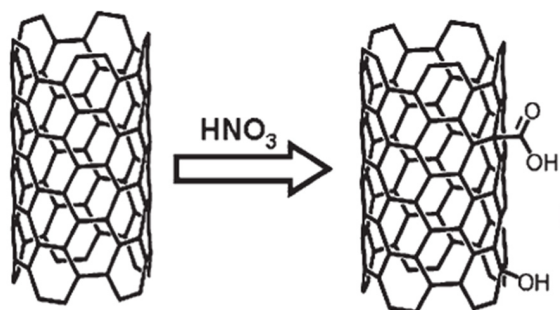
123. The Bosnyak-129-Albuerne combination renders obvious this limitation. As an initial matter, Bosnyak-129 seems to use the terms “carbon nanotube” and “carbon nanotube fibers” interchangeably. For instance, Bosnyak-129 says that “[i]n various embodiments, a plurality of *carbon nanotubes* is disclosed comprising single wall, double wall or multiwall *carbon nanotube*

fibers” and further that “[t]he fibers can have oxidation species comprising of carboxylic acid or derivative carboxylate groups and are essentially *discrete individual fibers*, not entangled as a mass.” LGES-1006, [0007]; *see also id.*, [0064]-[0065].

124. In any case, Bosnyak-129 discloses a plurality of “discrete carbon nanotube fibers.” *See* LGES-1006, [0011] (“In another embodiment, a method for preparing carbon nanotube fibers is disclosed, said method comprising suspending entangled non-discrete multi-wall carbon nanotube fibers in an acidic solution, optionally agitating said composition, sonically treating said suspended nanotube fiber composition to form *discrete carbon nanotube fibers ...*”). Bosnyak-129 also discloses that the discrete carbon nanotube fibers can be obtained by contacting the carbon nanotubes with an acid solution and sonicating them. LGES-1006, [0011] (“In another embodiment, a method for preparing carbon nanotube fibers is disclosed, said method comprising suspending entangled non-discrete multi-wall carbon nanotubes fibers in an acidic solution, optionally agitating said composition, sonically treating said suspended nanotube fiber composition to form discrete carbon nanotube fibers...”), [0012] (“In another embodiment, the method for preparing carbon nanotube fibers include an acidic solution which comprises a solution of sulfuric acid and nitric acid

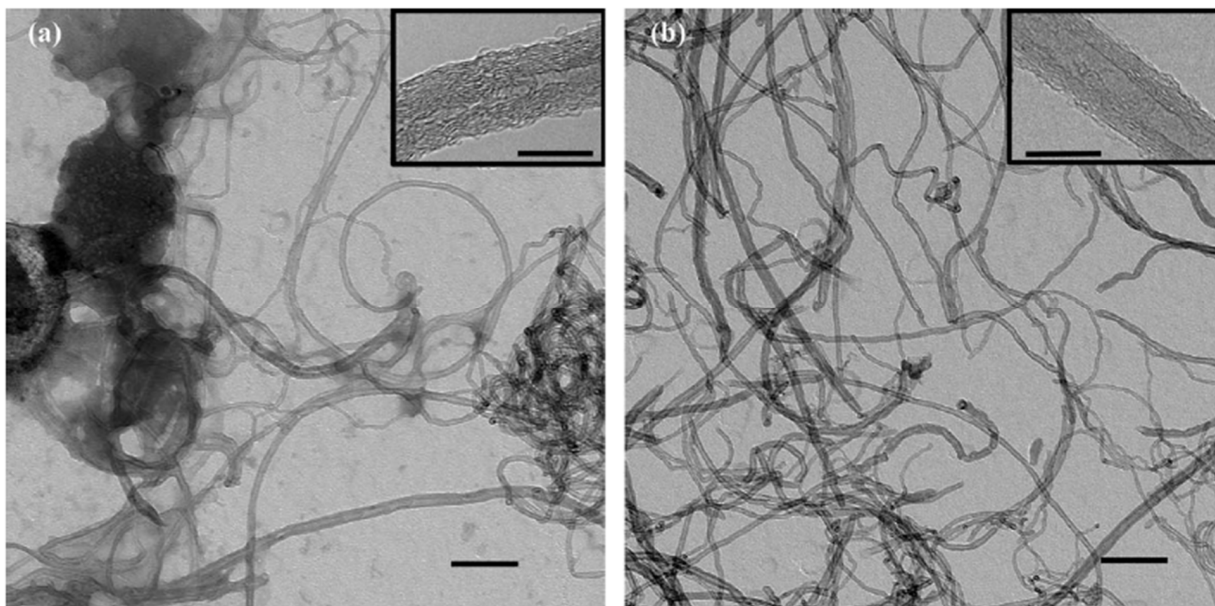
wherein the nitric acid is present in a dry basis of from about 10 wt% to about 50 wt%...”), [0071], [0076], [0154]-[0155]. Bosnyak-129 teaches that the acid treatment leads to oxidation of the nanotubes generating carboxylic acid/carboxylate groups. *Id.*, [0007] (“[T]he fibers can have oxidation species comprising of carboxylic acid or derivative carboxylate groups and are essentially discrete individual fibers, not entangled as a mass.”), [0065] (similar), Claim 3 (“wherein the oxidation species comprises carboxylic acid or derivative carboxylate groups”).

125. Similar to the teachings of Bosnyak-129, Albuerne also teaches oxidizing carbon nanotubes using an acid treatment to form carboxylic acid/carboxylate groups. For example, as illustrated below, Albuerne teaches a “typical experiment” in which a nitric acid solution is used with an ultrasonication bath to form carboxylic acid groups on the carbon nanotubes. LGES-1009, 1036, 1040.



Albuerne, Figure 1 (cropped).

126. Albuerne goes on to explain that such oxidation of carbon nanotubes causes exfoliation and leads to improved dispersibility while preserving the carbon nanotube structure. *See* LGES-1009, 1040 (“After the acid treatment ... [t]he carbon nanotube length distribution is slightly shifted to higher values after the acid treatment, which could indicate that the reaction unbundles longer carbon nanotubes from the aggregates.”; *id.*, 1041 (“[T]he oxidation reaction using HNO_3 unbundles more efficiently the $\text{MWCNT}_{\text{FC}}^9$”). Albuerne compares using TEM images of the pristine (i.e., without acid treatment, as shown in the left image (a) below) and oxidized (i.e., with acid treatment, as shown in the right image (b) below) carbon nanotubes $\text{MWCNT}_{\text{BMS}}^{95}$ in Figure 1 (reproduced below). As illustrated below, the acid treatment is shown to debundle the nanotubes into an individual exfoliated and dispersed state. In other words, Albuerne carried out acid treatment and sonication steps to obtain the carboxylate groups to obtain exfoliated carbon nanotubes, similar to Bosnyak-129. While now shown for $\text{MWCNT}_{\text{FC}}^{99}$, a POSITA would expect similar dispersion to occur for the nanotubes of Bosnyak-129.



Albuerne, Figure 3.

127. Notably, Albuerne uses a milder acidic treatment (using only nitric acid) than the one described in Bosnyak-129 (using a mixture of sulfuric acid and nitric acid) because “stronger acids (like sulfuric acid) or air oxidation at high temperatures” can “lead to the destruction of the graphitic structure[and] reduction on the length” of the nanotubes. LGES-1009, 1038.
- Albuerne also describes that the milder acid treatment was carried out “to preserve the carbon nanotubes ... without cutting the length of the carbon nanotubes or lo[osing any of the walls.” *Id.* Thus, for at least the reasons discussed above for the combination of Bosnyak-129 and Albuerne, a POSITA would have found it obvious to interchangeably use the nitric acid treatment step discussed in Albuerne as one of the possible “acidic solution”

discussed in Bosnyak-129 to achieve the well-known and recognized benefit of improving preservation of the carbon nanotubes' structures and lengths.

[1a-iii] wherein at least a portion of the discrete carbon nanotube fibers are open ended and

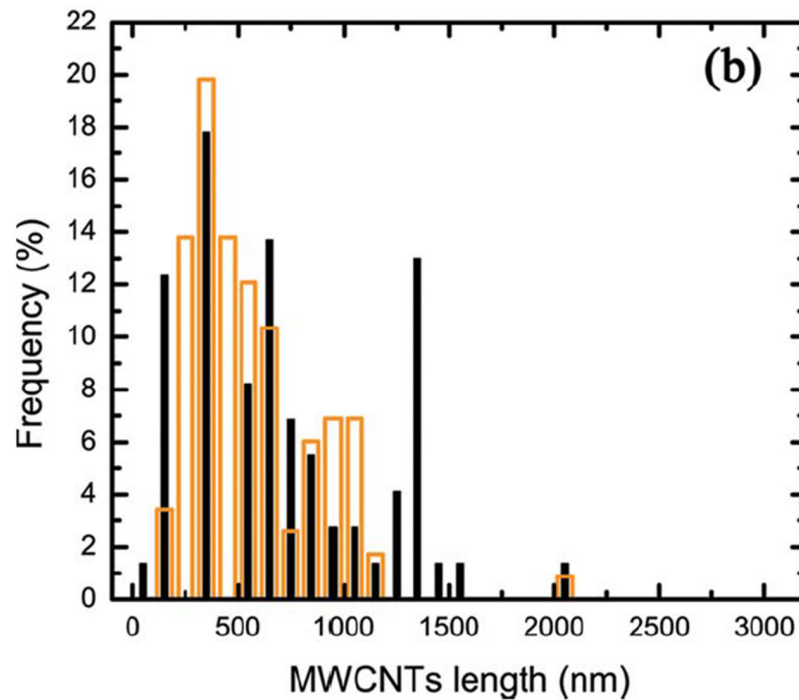
128. Bosnyak-129-Albuerne renders obvious this limitation. For example, Bosnyak-129 discloses that “carbon nanotube fibers having an aspect ratio of from about 25 to about 500” can include “open ended carbon nanotube fibers.” LGES-1006, Claims 1, 9; *see also id.*, [0008] (“The fibers can be *open-ended*.”), [0067] (“In another embodiment, the fibers can be *open-ended* to allow transport or storage of small molecules such as ethane or propane.”); *see also* LGES-1009, Fig. 1.
129. It was also well-known to a POSITA that a nitric acid treatment (such as the one described in Albuerne) leads to opening the end of a nanotube. LGES-1026, [0044] (“The prepared carbon nanotube was refluxed in concentrated nitric acid, thereby opening an end of the nanotube.”). Accordingly, a POSITA would have understood that at least a portion of the discrete carbon nanotube fibers in the Bosnyak-129-Albuerne combination's composition are open-ended.

[1a-ii] said fibers having an aspect ratio of from about 10 to about 500, and

[1b] wherein 40% to 90% by number of the discrete carbon nanotubes have an aspect ratio of 30-70 and wherein from 1% to 30% by number of discrete carbon nanotubes have an average aspect ratio 80-140.

130. Bosnyak-129-Albuerne renders obvious these limitations. While Bosnyak-129 does not expressly disclose the specific percentage and aspect ratio ranges claimed, Albuerne teaches that discrete carbon nanotubes that were obtained by similar processing conditions would have had a distribution of aspect ratios that meet the claimed percentage ranges recited in these limitations.

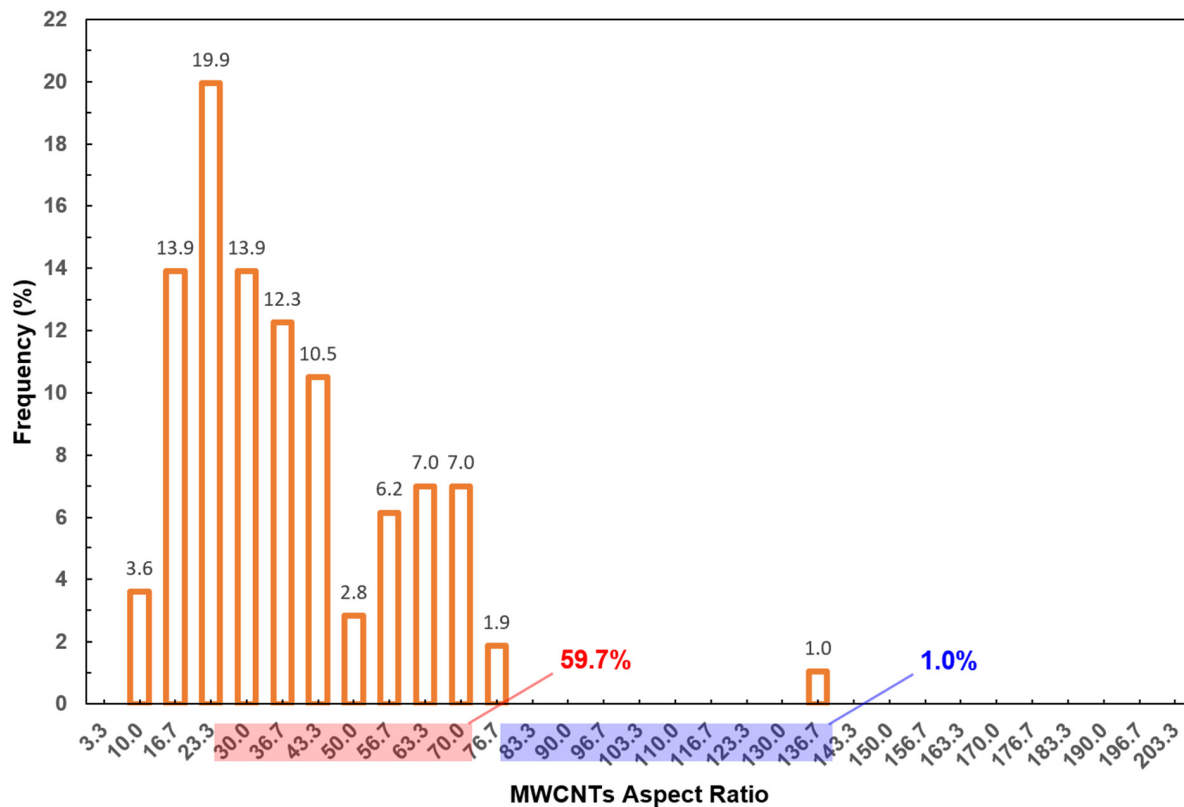
131. As I explained above, a POSITA would have found it obvious to utilize the nitric acid and sonication treatment steps taught by Albuerne to obtain the discrete carbon nanotube fibers discussed in Bosnyak-129. Referring again to Albuerne's example use of MWCNT_{FC}⁹⁹, Albuerne shows, through the orange boxes below, the length distribution of the oxidized MWCNT_{FC}⁹⁹ of the discrete nanotubes in Figure 5(b):



Albuerne, Figure 5(b).

132. Here, the length distribution was measured by scanning force microscopy (SFM) based on approximately 100 independent length measurements from different positions on silicon wafer that the nanotubes were deposited on. LGES-1009, 1039-1040. In other words, these lengths were measured only on those nanotubes that were dispersed into solution as discrete nanotubes, and does not count the ones that remain aggregated.
133. In view of Bosnyak-129's teaching that the aspect ratio is "the ratio of length of the nanotube to the diameter of the nanotube," LGES-1006, [0007], a POSITA would have been able to readily calculate the aspect ratio

distribution of the oxidized MWCNT_{FC}⁹⁹ based on Figure 5(b) above by dividing the observed length with the external mean diameter of 15 nm disclosed by Albuerne. *See* LGES-1009, Abstract, 1036. Based on this simple calculation, a POSITA would have found Albuerne's oxidized MWCNT_{FC}⁹⁹ to have an aspect ratio distribution as follows, which shows aspect ratios ranging from 10 to 137



Albuerne, Figures 5(b) (replotted to show number percentage)

134. Bosnyak-129 similarly discloses that “[i]n various embodiments, a plurality of carbon nanotubes is disclosed comprising single wall, double wall or

multiwall *carbon nanotube fibers having an aspect ratio* (the ratio of length of the nanotube to the diameter of the nanotube) of from *about 25 to about 500*[... .” LGES-1006, [0007], [0064], Claim 1 (“A plurality of carbon nanotubes comprising carbon nanotube fibers having an aspect ratio of from about 25 to about 500.”). Albuerne’s disclosed range between 10 to 137 and Bosnyak-129’s disclose range of “about 25 to about 500” both fall within and render obvious the claimed range of “about 10 to about 500.” By disclosing an aspect ratio range that falls within the claimed range, both Bosnyak-129 and Albuerne meets limitation [1b].

135. Furthermore, Albuerne’s distribution teaches the specific percentages of the aspect ratio ranges claimed in limitations [1b]. First, as shown in the above figure, the relative number (i.e., frequency) of discrete carbon nanotubes with an aspect ratio of 30-70 is 59.7%, which falls within the claimed range of “40% to 90% by number of the discrete carbon nanotubes have an aspect ratio of 30-70.” Second, also as shown in the above figure, the relative number of discrete carbon nanotubes with an aspect ratio of 80-140 is 1.0%, which falls within the claimed range of from “1% to 30% by number of discrete carbon nanotubes have an average aspect ratio 80-140.”

Incidentally, the term “average aspect ratio” as used in the claims of the ’282

Patent does not appear to be distinguished from the term “aspect ratio,”
which is also used in the claims.

(2) Claims 5 and 6

[5] The composition of claim 1, further comprising at least one polymer.

[6] The composition of claim 5, wherein the polymer is selected from the group consisting of vinyl polymers, poly(styrene-butadiene), partially or fully hydrogenated poly(styrene butadiene) containing copolymers, functionalized poly(styrene butadiene) copolymers such as carboxylated poly(styrene butadiene), poly(styrene-isoprene), poly(methacrylic acid), poly(methylmethacrylate), poly(acrylic acid), poly(vinylalcohols), poly(vinylacetates), fluorinated polymers, polyvinylpyrrolidone, conductive polymers, polymers derived from natural sources, polyethers, polyesters, polyurethanes, and polyamides; homopolymers, graft, block or random co- or ter-polymers, and mixtures thereof.

136. The Bosnyak-129-Albuerne combination renders obvious claims 5 and 6.

Indeed, Bosnyak-129 discloses that its exfoliated carbon nanotubes are modified with electroactive materials that include a conductive polymer.

For instance, it teaches that “the exfoliated carbon nanotubes are modified with an electroactive material. [T]he electroactive material may be a

conducting polymer such as, for example, polyaniline, polyvinylpyrrole .”

LGES-1006, [0092], [0139]. Here, polyvinylpyrrole likely refers to

polyvinylpyrrolidone. As further noted in Bosnyak-129, “[c]arbon

nanotubes associated or functionalized with an electroactive material may be particularly advantageous for applications involving electrical conductivity.”

Id., [0092]. Thus, a POSITA would have recognized or otherwise found it

obvious to improve performance of lithium-ion batteries by using such materials in conjunction with carbon nanotubes.

(3) Claim 7

[7] The composition of claim 1, wherein the carbon nanotubes are further functionalized.

137. The Bosnyak-129-Albuerne combination renders obvious claim 7. For example, Bosnyak-129 discloses that “[i]n various embodiments, the bundled and/or exfoliated carbon nanotubes may include, for example, ... functionalized carbon nanotubes.” *See, e.g.*, LGES-1006, [0090], [0091], [0092] (“[T]he carbon nanotubes may be further associated or functionalized with an electroactive material.... Carbon nanotubes associated or *functionalized with an electroactive material* may be particularly advantageous for applications involving electrical conductivity.”), [00102], [00121]. These are various clear examples of carbon nanotubes, as contemplated in the Bosnyak-129-Albuerne combination, that are functionalized.

(4) Claim 8

[8] The composition of claim 1, further comprising at least one dispersion aid.

138. The Bosnyak-129-Albuerne combination renders obvious claim 8. For example, Bosnyak-129 discloses examples of various well-known dispersion aids such as “surfactants for resuspension include, for example, both ionic

and non-ionic surfactants, such as, for example, polyvinyl pyrrolidone, sodium dodecyl sulfate and PLURONICS.” *See, e.g.*, LGES-1006, [00107], [00109] (“Surfactants are well known in the carbon nanotube art to aid in solubilization.... In various embodiments of the present disclosure, the surfactant may include, for example, sodium dodecyl sulfate, sodium dodecylbenzene sulfonate, or tetralkylammonium hydroxide.”), [00138] (“Electrolyte salts may also be used for dispersing the carbon nanotubes or maintaining exfoliated carbon nanotubes in an exfoliated state.”).

(5) Claim 9

[9] The composition of claim 1, further comprising at least a portion of discrete carbon nanotubes interspersed between graphene and/or oxidized graphene plates.

139. The Bosnyak-129-Albuerne combination renders obvious claim 9. For example, Bosnyak-129 teaches that the discrete carbon nanotube fibers are interspersed between graphene. LGES-1006, [0088] (“In another embodiment the nanotube fibers are further mixed or blended and/or sonicated with at least one material and an inorganic nanoplate to form a material nanotube fiber and nanoplate composition. The materials can be elastomers, thermoplastics and thermosets. *The nanoplates can be*, for example, clays, transition metal containing phosphates or *graphene*

structures. The nanoplates have an individual plate thickness less than 20nm.

The nanotube fibers of this invention can disperse between the individual nanoplates.”). Thus, at least a portion of the discrete carbon nanotubes in Bosnyak-129-Albuerne are interspersed between graphene and/or oxidized graphene plates.

(6) Claims 12-14

[12] The composition of claim 1, wherein the carbon nanotubes are oriented.

[13] The composition of claim 12, wherein the orientation is accomplished in a sheet, micro-layer, micro-layer with vertical film orientation, film, molding, extrusion, or fiber spinning fabrication method.

[14] The composition of claim 12, wherein orientation includes post fabrication methods, such as tentering, uniaxial orientation, biaxial orientation and thermoforming.

140. The Bosnyak-129-Albuerne combination renders obvious claims 12, 13, and

14. For example, regarding the nanotubes being “oriented” as per claim 12,

Bosnyak-129 notes that “the carbon nanotubes may be further oriented in an alignment step after isolating the exfoliated carbon nanotubes.” LGES-

1006, [00106]; *see also id.*, [00125] (“[T]he carbon nanotubes in polymers

can be oriented to be aligned by various methods known to those of ordinary skill in the art.”), [00140], [00142].

141. Bosnyak-129 also discloses that “the alignment may occur through *melt*

extrusion.” LGES-1006, [00142]; *see also id.*, [00140] (“[C]o-extrusion of

liquids or melts containing exfoliated carbon nanotubes through multilayer dies or multilayer generators may be used in making the energy storage devices of the present disclosure.”). This is an example of the “extrusion” method recited in claim 13.

142. As for claim 14, Bosnyak-129 discloses that numerous different fabrication and assembly techniques (i.e., post fabrication methods) may be used, one of which includes *thermoforming*. See LGES-1006, [0089] (“[T]he oxidized and exfoliated carbon nanotubes may also be used in *fabrication and assembly techniques* including, for example, ink-jet printing, spraying, coating, melt extruding, *thermoforming*, blow-molding, film blowing, foaming and injection molding.”).

(7) Claims 15-16

[15] The composition of claim 1, which further comprises electrolyte.

[16] The composition of claim 15, wherein the electrolyte comprises a polymer or a liquid.

143. The Bosnyak-129-Albuerne combination renders obvious claims 15 and 16.

For example, Bosnyak-129 disclose, with respect to its Figure 2, that “*electrolytes* 13 and 15 can contain exfoliated carbon nanotubes, which may be exfoliated conductive carbon nanotubes in some embodiments.” LGES-1006, [00133], [00134] (“[T]he electrolyte contains exfoliated carbon nanotubes.”); *see also id.*, [00138]; [00143] (“[I]ncorporation of exfoliated

carbon nanotubes to electrodes, electrolytes or dielectrics of the present energy storage devices provides enhanced strength and ruggedness to the device.”), [00159]. Additionally, according to Bosnyak-129, “the electrolyte of the energy storage devices can be a ... fluid” or “a polymer-gel type such as, for example, polyurethane-lithium perchlorate, polyvinyl alcohol-KOH-H₂O,” thereby satisfying the “a polymer or a liquid limitation” of claim 16. LGES-1006, [00138]; *id.*, [00159].

E. [GROUND 2B] – CLAIMS 2-4 AND 10-11 ARE OBVIOUS OVER BOSNYAK-129 IN VIEW OF ALBUERNE AND GU

144. It is my opinion that a POSITA would have found claims 2-4 and 10-11 to be obvious over Bosnyak-129 in view of Albuerne and Gu, as I discuss in the following sections.

1. Overview of Gu

145. Gu is generally directed to using carbon nanotubes to enhance the ionic conductivity of electrolytes in lithium ion batteries. *See* LGES-1016, Abstract (“To enhance the ionic conductivity in solid phase polyelectrolyte systems for lithium ion battery applications.... The improvement of ionic conductivity was attributed to ... (ii) the MWNT contribution in the interfacial region, and (iii) the preferential adsorption of lithium-ions along the carbon nanotubes.”). Gu further teaches that such enhancement is likely

attributable to the “improved ionic transport due to the MWNTs themselves.” *Id.*, 1878. Gu also describes specific examples of electrolyte materials made with carbon nanotubes where the resulting conductivity ranges from approximately 10^{-6} Siemens/cm to 10^{-5} Siemens/cm. LGES-1016, 1875, FIG. 2.

2. The Bosnyak-129-Albuerne-Gu Combination

146. A POSITA would have been motivated to combine Bosnyak-129-Albuerne as described above further with Gu for multiple reasons. For example, similar to Bosnyak-129, Gu seeks to improve the performance of lithium ion batteries. Gu does so by adding carbon nanotubes into electrolytes, which is precisely one of the application Bosnyak-129 teaches. LGES-1016, Abstract (“To enhance the ionic conductivity in solid phase polyelectrolyte systems for lithium ion battery applications... we report on a strategy involving.... carboxylic acid functionalized multi-walled carbon nanotubes (MWNTs).”); LGES-1006, [00134] (“FIGURE 3 shows an illustrative arrangement of the basic elements of a battery. ... In an embodiment, the ions are metal ions such as, for example, lithium ions. Hence, the present disclosure describes a lithium battery containing exfoliated nanotubes. ... In some embodiments, the electrolyte contains exfoliated carbon nanotubes.”). Indeed, each of Bosnyak-129, Albuerne, and Gu contemplate utilizing carbon nanotubes that

have been functionalized with carboxylic acid groups. *See* LGES-1006, [0007] (“The fibers can have oxidation species comprising of carboxylic acid or derivative carboxylate groups and are essentially discrete individual fibers, not entangled as a mass.”); LGES-1009, Figure 1 (showing carbon nanotubes functionalized with carboxylic acid groups after nitric acid treatment); LGES-1016 Abstract (“[W]e report on a strategy involving ... carboxylic acid functionalized multi-walled carbon nanotubes (MWNTs).”).

147. As such, the contemplated combination merely involves combining well-known components often found in lithium ion batteries in a known and predictable manner. Hence, a POSITA would have had a reasonable expectation of success in incorporating Albuerne’s exfoliated carbon nanotubes that were treated using nitric acid to include carboxylic acid groups as a component in an electrolyte, as per Gu and Bosnyak-129, to increase the ionic conductivity, as per Gu.

3. Claim-by-Claim Analysis

(1) Claim 2

[2] The composition of claim 1, wherein the portion of discrete carbon nanotubes that are open ended are ion conducting.

148. The Bosnyak-129-Albuerne-Gu combination renders obvious claim 2. For example, Bosnyak-129 teaches that any of the energy storage device components, such as “current collectors, electrodes, insulators, electrolytes

and separators contain[] exfoliated carbon nanotubes.” LGES-1006, [00131]. Moreover, Bosnyak-129’s “electrolytes 13 and 15 can contain exfoliated carbon nanotubes, which may be exfoliated conductive carbon nanotubes.” *Id.*, [00133]. Bosnyak-129 further teaches that open-ended carbon nanotubes allow transport of small molecules. *See Id.*, [0067] (“In another embodiment, the fibers can be open-ended to allow transport or storage of small molecules such as ethane or propane.”). Bosnyak-129 does not explicitly mention the well recognized notion that the open ended carbon nanotubes are ion conducting.

149. Yet the fact that open-ended carbon nanotubes are ion conducting was well-known to a POSITA. For example, Gu teaches utilizing carbon nanotubes to enhance the ionic conductivity for electrolytes in lithium ion batteries. *See* LGES-1016, Abstract (“To enhance the ionic conductivity in solid phase polyelectrolyte systems for lithium ion battery applications.... The improvement of ionic conductivity was attributed to ... (ii) the MWNT contribution in the interfacial region, and (iii) the preferential adsorption of lithium-ions along the carbon nanotubes.”). Specifically, Gu teaches that the improvement is likely attributable to the “improved ionic transport due to the MWNTs themselves.” *Id.*, 1878. Gu attributed this to the increased adsorption and diffusion of the lithium ions through the open ends of the

carbon nanotubes. *See Id.* (“It is known that the charger carrier (Li^+) concentration increases with MWNTs as Li^+ ions prefer adsorbing at the walls of the MWNTs. Similar phenomena were also observed for single walled nanotubes, where *Li diffusion to the interior of SWNTs occurred through open ends* and sidewall defects. Thus, the blended film structure of incorporated MWNT may provide a pathway for both improved ion transfer through the polymer matrix and *intra-MWNT ion transport* unhindered by the otherwise poorly conductive PAA, yielding PAA-rich films with high ionic conductivity.”).

(2) Claim 3

[3] The composition of claim 2, further comprising additional inorganic structures comprising elements of the groups two through fourteen of the Periodic Table of Elements.

150. The Bosnyak-129-Albuerne-Gu combination renders obvious claim 3. For example, Bosnyak-129 teaches that its exfoliated carbon nanotubes are modified with electroactive materials that include elements found in Groups 2 through 14 of the Periodic Table of Elements. Moreover, Bosnyak-129 teaches that “the exfoliated carbon nanotubes are modified with an electroactive material. In some embodiments, the electroactive material is a transition metal or transition metal oxide. Electroactive transition metals include, for example, Ru, Ir, W, Mo, Mn, Ni, and Co.” LGES-1006,

[00139]. These electroactive materials can be a “nanomaterial bound to the exfoliated carbon nanotubes. In some embodiments, the nanomaterial may be, for example, SnO₂, Li₄Ti₅O₁₂, silicon nanotubes, silicon nanoparticles, and various combinations thereof.” *Id.*, [00139], [0092]. As Bosnyak-129 notes, “[c]arbon nanotubes associated or functionalized with an electroactive material may be particularly advantageous for applications involving electrical conductivity,” *id.*, [0092], which is one of the properties a POSITA would have been concerned with in a lithium-ion battery application.

(3) Claim 4

[4] The composition of claim 2, further comprising non-fiber carbon structures selected from the group consisting of carbon black, graphite, graphene, oxidized graphene, fullerenes, and mixtures thereof.

151. The Bosnyak-129-Albuerne-Gu combination renders obvious claim 4. For example, Bosnyak-129 teaches that the carbon nanotube fibers are further mixed with graphene. LGES-1006, [0088] (“In another embodiment the nanotube fibers are further mixed or blended and/or sonicated with at least one material and an inorganic nanoplate to form a material nanotube fiber and nanoplate composition. The materials can be elastomers, thermoplastics and thermosets. *The nanoplates can be*, for example, clays, transition metal containing phosphates or *graphene* structures. The nanoplates have an individual plate thickness less than 20nm. *The nanotube fibers of this*

invention can disperse between the individual nanoplates.”).

(4) Claims 10-11

[10] The composition of claim 1, wherein the binder material has an impedance of less than or equal to about one billion ohm-m.

[11] The composition of claim 1, where the electrolyte material or separator film has a charge transfer resistance of less than or equal to about 10 million ohm-m.

152. The Bosnyak-129-Albuerne-Gu renders obvious claim 10 and 11. For example, with respect to claim 10, a POSITA would have recognized that the recited “impedance of less than or equal to about one billion ohm-m” is an extremely broad range that is likely to be satisfied by any material where, as in Bosnyak-129-Albuerne-Gu, improved conductivity is desired. For instance, Bosnyak-129 describes that a matt made of nanotubes can have a conductivity of “at least 0.1 Siemens/cm and as high as 100 Siemens/cm.” LGES-1006, [0008]. Such levels of conductivity corresponds to an impedance of 0.0001 ohm-m to 0.1 ohm-m, which is far less than the claims value of one billion ohm-m.

153. Regarding claim 11, a POSITA would have also known that the recited “charge transfer resistance of less than or equal to about 10 million ohm-m” is also an extremely broad range that is likely to be satisfied by any material where, as in Bosnyak-129-Albuerne, improved conductivity (*i.e.*, reduced

resistivity) is desired. Gu describes the use of carbon nanotubes in an electrolyte for improved conductivity. LGES-1016,1872. Gu also mentions specific examples of electrolyte materials made with carbon nanotubes where the resulting conductivity ranges from approximately 10^{-6} Siemens/cm to 10^{-5} Siemens/cm. LGES-1016, 1875, FIG. 2. In view of the inverse relationship between conductivity and resistance, these conductivity values can be readily converted to a charge transfer resistance of 1000 to 10,000 ohm-m, which is far less than 10 million ohm-m and thus fall within the claimed.

154. Thus, it would have been obvious to modify the Bosnyak-129-Albuerne combination's composition to have the conductivity values such as those taught by Gu. *See* LGES-1016, 1875 (“[PEO/PAA/PEO/(PAA + MWNT)]_m LBL films provide thickness-normalized ionic conductivity values of 10^{-5} S cm⁻¹ for ultrathin films and 10^{-6} S cm⁻⁸ for undoped bulk films, while the corresponding values for [PEO/PAA]_n films are 10^{-7} S cm⁻¹ and 10^{-9} S cm⁻¹. ... [I]n the presence of lithium triflate dopant, the tri-component (MWNT) system shows relatively stable ionic conductivity on the order of 10^{-5} S cm⁻¹ over a broad range of thicknesses.”). Among other things, a POSITA would have understood to use the “the presence of the MWNTS[with] ... their *carboxylic acid moieties* ... ” to obtain conductivity values that would have

provided a composition that met limitations [10] and [11]. *See id.*, 1878.

Thus, the Bosnyak-129-Albuerne-Gu combination renders obvious these claims.

VI. LEGAL PRINCIPLES

A. Anticipation

155. I have been informed that a patent claim is invalid as anticipated under 35 U.S.C. § 102 if each and every element of a claim, as properly construed, is found either explicitly or inherently in a single prior art reference. Under the principles of inherency, if the prior art necessarily functions in accordance with, or includes the claimed limitations, it anticipates.
156. I have been informed that a claim is invalid under 35 U.S.C. § 102(a) if the claimed invention was known or used by others in the U.S., or was patented or published anywhere, before the applicant's invention. I further have been informed that a claim is invalid under 35 U.S.C. § 102(b) if the invention was patented or published anywhere, or was in public use, on sale, or offered for sale in this country, more than one year prior to the filing date of the patent application (critical date). And a claim is invalid, as I have been informed, under 35 U.S.C. § 102(e), if an invention described by that claim was described in a U.S. patent granted on an application for a patent by

another that was filed in the U.S. before the date of invention for such a claim.

B. Obviousness

157. I have been informed that a patent claim is invalid as “obvious” under 35 U.S.C. § 103 in light of one or more prior art references if it would have been obvious to a POSITA, taking into account (1) the scope and content of the prior art, (2) the differences between the prior art and the claims, (3) the level of ordinary skill in the art, and (4) any so called “secondary considerations” of non-obviousness, which include: (i) “long felt need” for the claimed invention, (ii) commercial success attributable to the claimed invention, (iii) unexpected results of the claimed invention, and (iv) “copying” of the claimed invention by others.
158. I have been informed that a claim can be obvious in light of a single prior art reference or multiple prior art references. To be obvious in light of a single prior art reference or multiple prior art references, there must be a reason to modify the single prior art reference, or combine two or more references, in order to achieve the claimed invention. This reason may come from a teaching, suggestion, or motivation to combine, or may come from the reference or references themselves, the knowledge or “common sense” of one skilled in the art, or from the nature of the problem to be solved, and

may be explicit or implicit from the prior art as a whole. I have been informed that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. I also understand it is improper to rely on hindsight in making the obviousness determination.

VII. ADDITIONAL REMARKS

159. I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.
160. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code.

Dated: June 11, 2024

By: 
Samuel P. Guido

APPENDIX A

Son Embodiment 2, Peak Location, First Sigmas

1st/2nd	1			
Stdv 1	0.34 B			
mean 1	4.02 B			
stdv 2	0.34 A			
mean 2	5.14 A			
L/d 30-70		36.6%	59.6%	
L/d 40-60		22.1%	35.5%	
L/d 80-140		20.8%	15.5%	
L/d 90-120		9.7%	7.4%	
SUM of dist	1.991849	1	0.025181	1

Aspect	Rati	m1	m2	m1 + m2	m/M	m/A	n/N
1	5.16E-31	2.76E-50	5.16E-31	2.59E-31	5.16E-31	2.05E-29	
2	9.49E-22	4.19E-38	9.49E-22	4.77E-22	4.75E-22	1.88E-20	
3	3.63E-17	8.16E-32	3.63E-17	1.82E-17	1.21E-17	4.81E-16	
4	2.74E-14	9.98E-28	2.74E-14	1.37E-14	6.84E-15	2.72E-13	
5	2.85E-12	9.02E-25	2.85E-12	1.43E-12	5.7E-13	2.26E-11	
6	9.21E-11	1.71E-22	9.21E-11	4.62E-11	1.53E-11	6.09E-10	
7	1.39E-09	1.15E-20	1.39E-09	6.98E-10	1.99E-10	7.89E-09	
8	1.24E-08	3.72E-19	1.24E-08	6.21E-09	1.54E-09	6.14E-08	
9	7.47E-08	7.04E-18	7.47E-08	3.75E-08	8.3E-09	3.3E-07	
10	3.38E-07	8.82E-17	3.38E-07	1.69E-07	3.38E-08	1.34E-06	
11	1.22E-06	8E-16	1.22E-06	6.1E-07	1.11E-07	4.39E-06	
12	3.66E-06	5.59E-15	3.66E-06	1.84E-06	3.05E-07	1.21E-05	
13	9.5E-06	3.16E-14	9.5E-06	4.77E-06	7.31E-07	2.9E-05	
14	2.19E-05	1.49E-13	2.19E-05	1.1E-05	1.56E-06	6.21E-05	
15	4.57E-05	6.07E-13	4.57E-05	2.29E-05	3.04E-06	0.000121	
16	8.75E-05	2.17E-12	8.75E-05	4.39E-05	5.47E-06	0.000217	
17	0.000156	6.96E-12	0.000156	7.82E-05	9.17E-06	0.000364	
18	0.000261	2.03E-11	0.000261	0.000131	1.45E-05	0.000576	
19	0.000414	5.43E-11	0.000414	0.000208	2.18E-05	0.000865	
20	0.000627	1.35E-10	0.000627	0.000315	3.13E-05	0.001244	
21	0.00091	3.15E-10	0.00091	0.000457	4.33E-05	0.001721	
22	0.001275	6.92E-10	0.001275	0.00064	5.79E-05	0.002301	
23	0.001728	1.44E-09	0.001728	0.000867	7.51E-05	0.002983	
24	0.002275	2.87E-09	0.002275	0.001142	9.48E-05	0.003765	
25	0.00292	5.47E-09	0.00292	0.001466	0.000117	0.004638	
26	0.00366	1E-08	0.00366	0.001837	0.000141	0.00559	
27	0.004492	1.77E-08	0.004492	0.002255	0.000166	0.006606	
28	0.005408	3.04E-08	0.005408	0.002715	0.000193	0.007671	

29	0.0064	5.05E-08	0.0064	0.003213	0.000221	0.008764
30	0.007455	8.17E-08	0.007455	0.003743	0.000248	0.009868
31	0.008559	1.29E-07	0.008559	0.004297	0.000276	0.010964
32	0.009697	1.99E-07	0.009697	0.004868	0.000303	0.012034
33	0.010853	3E-07	0.010854	0.005449	0.000329	0.013061
34	0.012012	4.43E-07	0.012013	0.006031	0.000353	0.014031
35	0.013159	6.42E-07	0.01316	0.006607	0.000376	0.014931
36	0.014278	9.16E-07	0.014279	0.007169	0.000397	0.015751
37	0.015357	1.28E-06	0.015358	0.00771	0.000415	0.016483
38	0.016382	1.77E-06	0.016384	0.008225	0.000431	0.017122
39	0.017343	2.42E-06	0.017346	0.008708	0.000445	0.017662
40	0.018232	3.25E-06	0.018235	0.009155	0.000456	0.018104
41	0.019041	4.31E-06	0.019045	0.009561	0.000465	0.018447
42	0.019764	5.64E-06	0.019769	0.009925	0.000471	0.018692
43	0.020397	7.32E-06	0.020404	0.010244	0.000475	0.018844
44	0.020938	9.38E-06	0.020948	0.010517	0.000476	0.018906
45	0.021387	1.19E-05	0.021399	0.010743	0.000476	0.018884
46	0.021742	1.5E-05	0.021757	0.010923	0.000473	0.018783
47	0.022007	1.87E-05	0.022025	0.011058	0.000469	0.01861
48	0.022183	2.31E-05	0.022206	0.011148	0.000463	0.018372
49	0.022274	2.83E-05	0.022302	0.011197	0.000455	0.018074
50	0.022283	3.45E-05	0.022318	0.011204	0.000446	0.017725
51	0.022216	4.16E-05	0.022258	0.011175	0.000436	0.017331
52	0.022078	4.99E-05	0.022128	0.011109	0.000426	0.016899
53	0.021874	5.95E-05	0.021934	0.011012	0.000414	0.016434
54	0.02161	7.04E-05	0.02168	0.010884	0.000401	0.015944
55	0.02129	8.29E-05	0.021373	0.01073	0.000389	0.015432
56	0.020922	9.7E-05	0.021019	0.010553	0.000375	0.014905
57	0.02051	0.000113	0.020623	0.010354	0.000362	0.014368
58	0.020061	0.000131	0.020191	0.010137	0.000348	0.013825
59	0.019578	0.000151	0.019729	0.009905	0.000334	0.013279
60	0.019068	0.000173	0.019241	0.00966	0.000321	0.012735
61	0.018536	0.000197	0.018732	0.009405	0.000307	0.012195
62	0.017984	0.000224	0.018208	0.009141	0.000294	0.011662
63	0.017419	0.000253	0.017672	0.008872	0.000281	0.011139
64	0.016844	0.000285	0.017128	0.008599	0.000268	0.010628
65	0.016262	0.000319	0.016581	0.008324	0.000255	0.01013
66	0.015676	0.000357	0.016033	0.008049	0.000243	0.009647
67	0.01509	0.000398	0.015488	0.007776	0.000231	0.00918
68	0.014507	0.000441	0.014948	0.007505	0.00022	0.00873
69	0.013928	0.000488	0.014416	0.007238	0.000209	0.008297
70	0.013356	0.000538	0.013894	0.006975	0.000198	0.007882
71	0.012793	0.000591	0.013384	0.006719	0.000189	0.007486
72	0.01224	0.000648	0.012887	0.00647	0.000179	0.007108

73	0.011698	0.000708	0.012406	0.006228	0.00017	0.006749
74	0.01117	0.000771	0.011941	0.005995	0.000161	0.006408
75	0.010655	0.000837	0.011492	0.00577	0.000153	0.006085
76	0.010155	0.000907	0.011062	0.005554	0.000146	0.00578
77	0.009669	0.000981	0.01065	0.005347	0.000138	0.005493
78	0.0092	0.001057	0.010257	0.00515	0.000132	0.005222
79	0.008747	0.001137	0.009884	0.004962	0.000125	0.004968
80	0.008309	0.001221	0.00953	0.004784	0.000119	0.004731
81	0.007888	0.001307	0.009195	0.004616	0.000114	0.004508
82	0.007484	0.001396	0.00888	0.004458	0.000108	0.0043
83	0.007095	0.001489	0.008584	0.00431	0.000103	0.004107
84	0.006723	0.001584	0.008307	0.00417	9.89E-05	0.003927
85	0.006366	0.001682	0.008049	0.004041	9.47E-05	0.00376
86	0.006025	0.001783	0.007809	0.00392	9.08E-05	0.003606
87	0.005699	0.001887	0.007586	0.003809	8.72E-05	0.003463
88	0.005389	0.001993	0.007382	0.003706	8.39E-05	0.003331
89	0.005092	0.002101	0.007194	0.003612	8.08E-05	0.00321
90	0.00481	0.002212	0.007022	0.003525	7.8E-05	0.003098
91	0.004542	0.002324	0.006866	0.003447	7.54E-05	0.002996
92	0.004286	0.002439	0.006725	0.003376	7.31E-05	0.002903
93	0.004044	0.002555	0.006599	0.003313	7.1E-05	0.002818
94	0.003814	0.002672	0.006486	0.003256	6.9E-05	0.00274
95	0.003595	0.002791	0.006386	0.003206	6.72E-05	0.00267
96	0.003388	0.002911	0.0063	0.003163	6.56E-05	0.002606
97	0.003192	0.003033	0.006225	0.003125	6.42E-05	0.002548
98	0.003006	0.003155	0.006161	0.003093	6.29E-05	0.002497
99	0.002831	0.003277	0.006108	0.003066	6.17E-05	0.00245
100	0.002665	0.0034	0.006065	0.003045	6.06E-05	0.002409
101	0.002508	0.003524	0.006031	0.003028	5.97E-05	0.002371
102	0.002359	0.003647	0.006007	0.003016	5.89E-05	0.002339
103	0.002219	0.003771	0.00599	0.003007	5.82E-05	0.002309
104	0.002087	0.003894	0.005981	0.003003	5.75E-05	0.002284
105	0.001962	0.004017	0.005979	0.003002	5.69E-05	0.002261
106	0.001844	0.004139	0.005984	0.003004	5.64E-05	0.002242
107	0.001733	0.004261	0.005994	0.003009	5.6E-05	0.002225
108	0.001629	0.004381	0.00601	0.003017	5.57E-05	0.00221
109	0.00153	0.004501	0.006031	0.003028	5.53E-05	0.002197
110	0.001438	0.004619	0.006057	0.003041	5.51E-05	0.002187
111	0.00135	0.004736	0.006087	0.003056	5.48E-05	0.002178
112	0.001268	0.004852	0.00612	0.003072	5.46E-05	0.00217
113	0.001191	0.004966	0.006156	0.003091	5.45E-05	0.002164
114	0.001118	0.005078	0.006195	0.00311	5.43E-05	0.002158
115	0.001049	0.005188	0.006237	0.003131	5.42E-05	0.002154
116	0.000985	0.005296	0.006281	0.003153	5.41E-05	0.00215

117	0.000925	0.005401	0.006326	0.003176	5.41E-05	0.002147
118	0.000868	0.005505	0.006373	0.003199	5.4E-05	0.002145
119	0.000814	0.005606	0.006421	0.003223	5.4E-05	0.002143
120	0.000764	0.005705	0.006469	0.003248	5.39E-05	0.002141
121	0.000717	0.005801	0.006518	0.003272	5.39E-05	0.002139
122	0.000673	0.005894	0.006567	0.003297	5.38E-05	0.002138
123	0.000631	0.005985	0.006616	0.003322	5.38E-05	0.002136
124	0.000592	0.006073	0.006665	0.003346	5.38E-05	0.002135
125	0.000555	0.006158	0.006714	0.003371	5.37E-05	0.002133
126	0.000521	0.00624	0.006761	0.003394	5.37E-05	0.002131
127	0.000489	0.006319	0.006808	0.003418	5.36E-05	0.002129
128	0.000458	0.006395	0.006854	0.003441	5.35E-05	0.002126
129	0.00043	0.006468	0.006898	0.003463	5.35E-05	0.002124
130	0.000403	0.006538	0.006941	0.003485	5.34E-05	0.00212
131	0.000378	0.006605	0.006983	0.003506	5.33E-05	0.002117
132	0.000355	0.006668	0.007023	0.003526	5.32E-05	0.002113
133	0.000333	0.006729	0.007061	0.003545	5.31E-05	0.002108
134	0.000312	0.006786	0.007098	0.003563	5.3E-05	0.002103
135	0.000293	0.006839	0.007132	0.003581	5.28E-05	0.002098
136	0.000274	0.00689	0.007164	0.003597	5.27E-05	0.002092
137	0.000257	0.006937	0.007195	0.003612	5.25E-05	0.002086
138	0.000241	0.006981	0.007223	0.003626	5.23E-05	0.002079
139	0.000226	0.007022	0.007249	0.003639	5.21E-05	0.002071
140	0.000212	0.00706	0.007272	0.003651	5.19E-05	0.002063
141	0.000199	0.007095	0.007294	0.003662	5.17E-05	0.002054
142	0.000187	0.007126	0.007313	0.003671	5.15E-05	0.002045
143	0.000175	0.007154	0.007329	0.00368	5.13E-05	0.002035
144	0.000164	0.007179	0.007344	0.003687	5.1E-05	0.002025
145	0.000154	0.007201	0.007355	0.003693	5.07E-05	0.002014
146	0.000145	0.00722	0.007365	0.003697	5.04E-05	0.002003
147	0.000136	0.007236	0.007372	0.003701	5.01E-05	0.001991
148	0.000127	0.007249	0.007376	0.003703	4.98E-05	0.001979
149	0.000119	0.007259	0.007379	0.003704	4.95E-05	0.001967
150	0.000112	0.007266	0.007378	0.003704	4.92E-05	0.001953
151	0.000105	0.007271	0.007376	0.003703	4.88E-05	0.00194
152	9.86E-05	0.007272	0.007371	0.003701	4.85E-05	0.001926
153	9.25E-05	0.007271	0.007364	0.003697	4.81E-05	0.001911
154	8.68E-05	0.007267	0.007354	0.003692	4.78E-05	0.001896
155	8.15E-05	0.007261	0.007342	0.003686	4.74E-05	0.001881
156	7.65E-05	0.007252	0.007328	0.003679	4.7E-05	0.001866
157	7.18E-05	0.007241	0.007312	0.003671	4.66E-05	0.00185
158	6.73E-05	0.007227	0.007294	0.003662	4.62E-05	0.001833
159	6.32E-05	0.00721	0.007274	0.003652	4.57E-05	0.001817
160	5.93E-05	0.007192	0.007251	0.00364	4.53E-05	0.0018

161	5.57E-05	0.007171	0.007227	0.003628	4.49E-05	0.001782
162	5.23E-05	0.007148	0.0072	0.003615	4.44E-05	0.001765
163	4.91E-05	0.007123	0.007172	0.003601	4.4E-05	0.001747
164	4.61E-05	0.007095	0.007141	0.003585	4.35E-05	0.001729
165	4.33E-05	0.007066	0.007109	0.003569	4.31E-05	0.001711
166	4.06E-05	0.007035	0.007076	0.003552	4.26E-05	0.001693
167	3.82E-05	0.007002	0.00704	0.003534	4.22E-05	0.001674
168	3.58E-05	0.006967	0.007003	0.003516	4.17E-05	0.001655
169	3.36E-05	0.006931	0.006964	0.003496	4.12E-05	0.001636
170	3.16E-05	0.006892	0.006924	0.003476	4.07E-05	0.001617
171	2.97E-05	0.006852	0.006882	0.003455	4.02E-05	0.001598
172	2.79E-05	0.006811	0.006839	0.003433	3.98E-05	0.001579
173	2.62E-05	0.006768	0.006794	0.003411	3.93E-05	0.00156
174	2.46E-05	0.006724	0.006748	0.003388	3.88E-05	0.00154
175	2.31E-05	0.006678	0.006701	0.003364	3.83E-05	0.001521
176	2.17E-05	0.006631	0.006653	0.00334	3.78E-05	0.001501
177	2.04E-05	0.006583	0.006603	0.003315	3.73E-05	0.001482
178	1.92E-05	0.006534	0.006553	0.00329	3.68E-05	0.001462
179	1.8E-05	0.006483	0.006501	0.003264	3.63E-05	0.001442
180	1.7E-05	0.006431	0.006448	0.003237	3.58E-05	0.001423
181	1.59E-05	0.006379	0.006395	0.00321	3.53E-05	0.001403
182	1.5E-05	0.006325	0.00634	0.003183	3.48E-05	0.001383
183	1.41E-05	0.006271	0.006285	0.003155	3.43E-05	0.001364
184	1.32E-05	0.006216	0.006229	0.003127	3.39E-05	0.001344
185	1.24E-05	0.00616	0.006172	0.003099	3.34E-05	0.001325
186	1.17E-05	0.006103	0.006114	0.00307	3.29E-05	0.001305
187	1.1E-05	0.006045	0.006056	0.003041	3.24E-05	0.001286
188	1.04E-05	0.005987	0.005997	0.003011	3.19E-05	0.001267
189	9.74E-06	0.005928	0.005938	0.002981	3.14E-05	0.001248
190	9.16E-06	0.005869	0.005878	0.002951	3.09E-05	0.001229
191	8.62E-06	0.005809	0.005818	0.002921	3.05E-05	0.00121
192	8.11E-06	0.005749	0.005757	0.00289	3E-05	0.001191
193	7.63E-06	0.005689	0.005696	0.00286	2.95E-05	0.001172
194	7.18E-06	0.005628	0.005635	0.002829	2.9E-05	0.001153
195	6.76E-06	0.005567	0.005573	0.002798	2.86E-05	0.001135
196	6.36E-06	0.005505	0.005511	0.002767	2.81E-05	0.001117
197	5.98E-06	0.005443	0.005449	0.002736	2.77E-05	0.001098
198	5.63E-06	0.005381	0.005387	0.002704	2.72E-05	0.00108
199	5.3E-06	0.005319	0.005325	0.002673	2.68E-05	0.001063
200	4.99E-06	0.005257	0.005262	0.002642	2.63E-05	0.001045
201	4.7E-06	0.005195	0.005199	0.00261	2.59E-05	0.001027
202	4.43E-06	0.005132	0.005137	0.002579	2.54E-05	0.00101
203	4.17E-06	0.00507	0.005074	0.002547	2.5E-05	0.000993
204	3.92E-06	0.005007	0.005011	0.002516	2.46E-05	0.000976

205	3.7E-06	0.004945	0.004949	0.002485	2.41E-05	0.000959
206	3.48E-06	0.004883	0.004886	0.002453	2.37E-05	0.000942
207	3.28E-06	0.004821	0.004824	0.002422	2.33E-05	0.000925
208	3.09E-06	0.004759	0.004762	0.002391	2.29E-05	0.000909
209	2.91E-06	0.004697	0.0047	0.002359	2.25E-05	0.000893
210	2.74E-06	0.004635	0.004638	0.002328	2.21E-05	0.000877
211	2.59E-06	0.004574	0.004576	0.002297	2.17E-05	0.000861
212	2.44E-06	0.004512	0.004515	0.002267	2.13E-05	0.000846
213	2.3E-06	0.004451	0.004454	0.002236	2.09E-05	0.00083
214	2.16E-06	0.00439	0.004393	0.002205	2.05E-05	0.000815
215	2.04E-06	0.00433	0.004332	0.002175	2.01E-05	0.0008
216	1.92E-06	0.00427	0.004272	0.002145	1.98E-05	0.000785
217	1.81E-06	0.00421	0.004212	0.002115	1.94E-05	0.000771
218	1.71E-06	0.004151	0.004152	0.002085	1.9E-05	0.000756
219	1.61E-06	0.004091	0.004093	0.002055	1.87E-05	0.000742
220	1.52E-06	0.004033	0.004034	0.002025	1.83E-05	0.000728
221	1.43E-06	0.003974	0.003976	0.001996	1.8E-05	0.000714
222	1.35E-06	0.003916	0.003918	0.001967	1.76E-05	0.000701
223	1.28E-06	0.003859	0.00386	0.001938	1.73E-05	0.000687
224	1.2E-06	0.003802	0.003803	0.001909	1.7E-05	0.000674
225	1.14E-06	0.003745	0.003746	0.001881	1.67E-05	0.000661
226	1.07E-06	0.003689	0.00369	0.001853	1.63E-05	0.000648
227	1.01E-06	0.003633	0.003634	0.001825	1.6E-05	0.000636
228	9.55E-07	0.003578	0.003579	0.001797	1.57E-05	0.000623
229	9.01E-07	0.003523	0.003524	0.001769	1.54E-05	0.000611
230	8.51E-07	0.003469	0.00347	0.001742	1.51E-05	0.000599
231	8.03E-07	0.003415	0.003416	0.001715	1.48E-05	0.000587
232	7.58E-07	0.003362	0.003363	0.001688	1.45E-05	0.000576
233	7.16E-07	0.003309	0.00331	0.001662	1.42E-05	0.000564
234	6.76E-07	0.003257	0.003258	0.001636	1.39E-05	0.000553
235	6.38E-07	0.003206	0.003206	0.00161	1.36E-05	0.000542
236	6.03E-07	0.003155	0.003155	0.001584	1.34E-05	0.000531
237	5.69E-07	0.003104	0.003105	0.001559	1.31E-05	0.00052
238	5.38E-07	0.003054	0.003055	0.001534	1.28E-05	0.00051
239	5.08E-07	0.003005	0.003005	0.001509	1.26E-05	0.000499
240	4.8E-07	0.002956	0.002956	0.001484	1.23E-05	0.000489
241	4.53E-07	0.002907	0.002908	0.00146	1.21E-05	0.000479
242	4.28E-07	0.00286	0.00286	0.001436	1.18E-05	0.000469
243	4.05E-07	0.002812	0.002813	0.001412	1.16E-05	0.00046
244	3.83E-07	0.002766	0.002766	0.001389	1.13E-05	0.00045
245	3.62E-07	0.00272	0.00272	0.001366	1.11E-05	0.000441
246	3.42E-07	0.002674	0.002675	0.001343	1.09E-05	0.000432
247	3.23E-07	0.002629	0.00263	0.00132	1.06E-05	0.000423
248	3.05E-07	0.002585	0.002585	0.001298	1.04E-05	0.000414

249	2.89E-07	0.002541	0.002541	0.001276	1.02E-05	0.000405
250	2.73E-07	0.002498	0.002498	0.001254	9.99E-06	0.000397
251	2.58E-07	0.002455	0.002455	0.001233	9.78E-06	0.000388
252	2.44E-07	0.002413	0.002413	0.001212	9.58E-06	0.00038
253	2.31E-07	0.002372	0.002372	0.001191	9.37E-06	0.000372
254	2.18E-07	0.002331	0.002331	0.00117	9.18E-06	0.000364
255	2.07E-07	0.00229	0.00229	0.00115	8.98E-06	0.000357
256	1.95E-07	0.00225	0.00225	0.00113	8.79E-06	0.000349
257	1.85E-07	0.002211	0.002211	0.00111	8.6E-06	0.000342
258	1.75E-07	0.002172	0.002172	0.001091	8.42E-06	0.000334
259	1.66E-07	0.002134	0.002134	0.001071	8.24E-06	0.000327
260	1.57E-07	0.002096	0.002096	0.001052	8.06E-06	0.00032
261	1.48E-07	0.002059	0.002059	0.001034	7.89E-06	0.000313
262	1.4E-07	0.002023	0.002023	0.001015	7.72E-06	0.000307
263	1.33E-07	0.001986	0.001987	0.000997	7.55E-06	0.0003
264	1.26E-07	0.001951	0.001951	0.00098	7.39E-06	0.000293
265	1.19E-07	0.001916	0.001916	0.000962	7.23E-06	0.000287
266	1.13E-07	0.001881	0.001882	0.000945	7.07E-06	0.000281
267	1.07E-07	0.001848	0.001848	0.000928	6.92E-06	0.000275
268	1.01E-07	0.001814	0.001814	0.000911	6.77E-06	0.000269
269	9.57E-08	0.001781	0.001781	0.000894	6.62E-06	0.000263
270	9.07E-08	0.001749	0.001749	0.000878	6.48E-06	0.000257
271	8.59E-08	0.001717	0.001717	0.000862	6.34E-06	0.000252
272	8.14E-08	0.001685	0.001686	0.000846	6.2E-06	0.000246
273	7.71E-08	0.001655	0.001655	0.000831	6.06E-06	0.000241
274	7.3E-08	0.001624	0.001624	0.000815	5.93E-06	0.000235
275	6.92E-08	0.001594	0.001594	0.0008	5.8E-06	0.00023
276	6.56E-08	0.001565	0.001565	0.000786	5.67E-06	0.000225
277	6.21E-08	0.001536	0.001536	0.000771	5.54E-06	0.00022
278	5.89E-08	0.001507	0.001507	0.000757	5.42E-06	0.000215
279	5.58E-08	0.001479	0.001479	0.000743	5.3E-06	0.000211
280	5.29E-08	0.001451	0.001452	0.000729	5.18E-06	0.000206
281	5.02E-08	0.001424	0.001424	0.000715	5.07E-06	0.000201
282	4.76E-08	0.001398	0.001398	0.000702	4.96E-06	0.000197
283	4.51E-08	0.001371	0.001371	0.000689	4.85E-06	0.000192
284	4.28E-08	0.001346	0.001346	0.000676	4.74E-06	0.000188
285	4.05E-08	0.00132	0.00132	0.000663	4.63E-06	0.000184
286	3.85E-08	0.001295	0.001295	0.00065	4.53E-06	0.00018
287	3.65E-08	0.001271	0.001271	0.000638	4.43E-06	0.000176
288	3.46E-08	0.001247	0.001247	0.000626	4.33E-06	0.000172
289	3.28E-08	0.001223	0.001223	0.000614	4.23E-06	0.000168
290	3.11E-08	0.0012	0.0012	0.000602	4.14E-06	0.000164
291	2.95E-08	0.001177	0.001177	0.000591	4.04E-06	0.000161
292	2.8E-08	0.001154	0.001154	0.000579	3.95E-06	0.000157

293	2.66E-08	0.001132	0.001132	0.000568	3.86E-06	0.000153
294	2.52E-08	0.00111	0.00111	0.000557	3.78E-06	0.00015
295	2.39E-08	0.001089	0.001089	0.000547	3.69E-06	0.000147
296	2.27E-08	0.001068	0.001068	0.000536	3.61E-06	0.000143
297	2.16E-08	0.001047	0.001047	0.000526	3.53E-06	0.00014
298	2.05E-08	0.001027	0.001027	0.000516	3.45E-06	0.000137
299	1.94E-08	0.001007	0.001007	0.000506	3.37E-06	0.000134
300	1.85E-08	0.000988	0.000988	0.000496	3.29E-06	0.000131
301	1.75E-08	0.000969	0.000969	0.000486	3.22E-06	0.000128
302	1.66E-08	0.00095	0.00095	0.000477	3.15E-06	0.000125
303	1.58E-08	0.000931	0.000931	0.000468	3.07E-06	0.000122
304	1.5E-08	0.000913	0.000913	0.000458	3E-06	0.000119
305	1.43E-08	0.000895	0.000895	0.000449	2.94E-06	0.000117
306	1.35E-08	0.000878	0.000878	0.000441	2.87E-06	0.000114
307	1.29E-08	0.000861	0.000861	0.000432	2.8E-06	0.000111
308	1.22E-08	0.000844	0.000844	0.000424	2.74E-06	0.000109
309	1.16E-08	0.000827	0.000827	0.000415	2.68E-06	0.000106
310	1.1E-08	0.000811	0.000811	0.000407	2.62E-06	0.000104
311	1.05E-08	0.000795	0.000795	0.000399	2.56E-06	0.000102
312	9.96E-09	0.000779	0.000779	0.000391	2.5E-06	9.92E-05
313	9.46E-09	0.000764	0.000764	0.000383	2.44E-06	9.69E-05
314	8.99E-09	0.000749	0.000749	0.000376	2.38E-06	9.47E-05
315	8.55E-09	0.000734	0.000734	0.000368	2.33E-06	9.25E-05
316	8.12E-09	0.000719	0.000719	0.000361	2.28E-06	9.04E-05
317	7.72E-09	0.000705	0.000705	0.000354	2.22E-06	8.83E-05
318	7.34E-09	0.000691	0.000691	0.000347	2.17E-06	8.63E-05
319	6.98E-09	0.000677	0.000677	0.00034	2.12E-06	8.43E-05
320	6.64E-09	0.000664	0.000664	0.000333	2.07E-06	8.24E-05
321	6.31E-09	0.000651	0.000651	0.000327	2.03E-06	8.05E-05
322	6E-09	0.000638	0.000638	0.00032	1.98E-06	7.86E-05
323	5.71E-09	0.000625	0.000625	0.000314	1.93E-06	7.68E-05
324	5.43E-09	0.000612	0.000613	0.000308	1.89E-06	7.51E-05
325	5.16E-09	0.0006	0.0006	0.000301	1.85E-06	7.33E-05
326	4.91E-09	0.000588	0.000588	0.000295	1.8E-06	7.17E-05
327	4.67E-09	0.000576	0.000576	0.000289	1.76E-06	7E-05
328	4.45E-09	0.000565	0.000565	0.000284	1.72E-06	6.84E-05
329	4.23E-09	0.000554	0.000554	0.000278	1.68E-06	6.68E-05
330	4.02E-09	0.000542	0.000542	0.000272	1.64E-06	6.53E-05
331	3.83E-09	0.000532	0.000532	0.000267	1.61E-06	6.38E-05
332	3.64E-09	0.000521	0.000521	0.000261	1.57E-06	6.23E-05
333	3.47E-09	0.00051	0.00051	0.000256	1.53E-06	6.09E-05
334	3.3E-09	0.0005	0.0005	0.000251	1.5E-06	5.95E-05
335	3.14E-09	0.00049	0.00049	0.000246	1.46E-06	5.81E-05
336	2.99E-09	0.00048	0.00048	0.000241	1.43E-06	5.67E-05

337	2.85E-09	0.00047	0.00047	0.000236	1.4E-06	5.54E-05
338	2.71E-09	0.000461	0.000461	0.000231	1.36E-06	5.41E-05
339	2.58E-09	0.000452	0.000452	0.000227	1.33E-06	5.29E-05
340	2.46E-09	0.000442	0.000442	0.000222	1.3E-06	5.17E-05
341	2.34E-09	0.000433	0.000433	0.000218	1.27E-06	5.05E-05
342	2.23E-09	0.000425	0.000425	0.000213	1.24E-06	4.93E-05
343	2.12E-09	0.000416	0.000416	0.000209	1.21E-06	4.82E-05
344	2.02E-09	0.000408	0.000408	0.000205	1.18E-06	4.7E-05
345	1.93E-09	0.000399	0.000399	0.0002	1.16E-06	4.6E-05
346	1.83E-09	0.000391	0.000391	0.000196	1.13E-06	4.49E-05
347	1.75E-09	0.000383	0.000383	0.000192	1.1E-06	4.39E-05
348	1.67E-09	0.000375	0.000375	0.000188	1.08E-06	4.28E-05
349	1.59E-09	0.000368	0.000368	0.000185	1.05E-06	4.18E-05
350	1.51E-09	0.00036	0.00036	0.000181	1.03E-06	4.09E-05
351	1.44E-09	0.000353	0.000353	0.000177	1.01E-06	3.99E-05
352	1.37E-09	0.000346	0.000346	0.000174	9.82E-07	3.9E-05
353	1.31E-09	0.000339	0.000339	0.00017	9.59E-07	3.81E-05
354	1.25E-09	0.000332	0.000332	0.000167	9.37E-07	3.72E-05
355	1.19E-09	0.000325	0.000325	0.000163	9.15E-07	3.63E-05
356	1.13E-09	0.000318	0.000318	0.00016	8.94E-07	3.55E-05
357	1.08E-09	0.000312	0.000312	0.000157	8.73E-07	3.47E-05
358	1.03E-09	0.000305	0.000305	0.000153	8.53E-07	3.39E-05
359	9.81E-10	0.000299	0.000299	0.00015	8.33E-07	3.31E-05
360	9.36E-10	0.000293	0.000293	0.000147	8.14E-07	3.23E-05
361	8.92E-10	0.000287	0.000287	0.000144	7.95E-07	3.16E-05
362	8.51E-10	0.000281	0.000281	0.000141	7.77E-07	3.08E-05
363	8.11E-10	0.000275	0.000275	0.000138	7.59E-07	3.01E-05
364	7.74E-10	0.00027	0.00027	0.000135	7.41E-07	2.94E-05
365	7.38E-10	0.000264	0.000264	0.000133	7.24E-07	2.87E-05
366	7.04E-10	0.000259	0.000259	0.00013	7.07E-07	2.81E-05
367	6.72E-10	0.000253	0.000253	0.000127	6.91E-07	2.74E-05
368	6.41E-10	0.000248	0.000248	0.000125	6.74E-07	2.68E-05
369	6.11E-10	0.000243	0.000243	0.000122	6.59E-07	2.62E-05
370	5.83E-10	0.000238	0.000238	0.00012	6.44E-07	2.56E-05
371	5.56E-10	0.000233	0.000233	0.000117	6.29E-07	2.5E-05
372	5.31E-10	0.000228	0.000228	0.000115	6.14E-07	2.44E-05
373	5.07E-10	0.000224	0.000224	0.000112	6E-07	2.38E-05
374	4.84E-10	0.000219	0.000219	0.00011	5.86E-07	2.33E-05
375	4.61E-10	0.000215	0.000215	0.000108	5.72E-07	2.27E-05
376	4.4E-10	0.00021	0.00021	0.000106	5.59E-07	2.22E-05
377	4.2E-10	0.000206	0.000206	0.000103	5.46E-07	2.17E-05
378	4.01E-10	0.000202	0.000202	0.000101	5.33E-07	2.12E-05
379	3.83E-10	0.000197	0.000197	9.91E-05	5.21E-07	2.07E-05
380	3.66E-10	0.000193	0.000193	9.71E-05	5.09E-07	2.02E-05

381	3.49E-10	0.000189	0.000189	9.51E-05	4.97E-07	1.97E-05
382	3.33E-10	0.000185	0.000185	9.31E-05	4.85E-07	1.93E-05
383	3.18E-10	0.000182	0.000182	9.12E-05	4.74E-07	1.88E-05
384	3.04E-10	0.000178	0.000178	8.93E-05	4.63E-07	1.84E-05
385	2.9E-10	0.000174	0.000174	8.75E-05	4.52E-07	1.8E-05
386	2.77E-10	0.000171	0.000171	8.57E-05	4.42E-07	1.76E-05
387	2.65E-10	0.000167	0.000167	8.39E-05	4.32E-07	1.71E-05
388	2.53E-10	0.000164	0.000164	8.21E-05	4.22E-07	1.67E-05
389	2.42E-10	0.00016	0.00016	8.05E-05	4.12E-07	1.64E-05
390	2.31E-10	0.000157	0.000157	7.88E-05	4.02E-07	1.6E-05
391	2.2E-10	0.000154	0.000154	7.72E-05	3.93E-07	1.56E-05
392	2.11E-10	0.000151	0.000151	7.56E-05	3.84E-07	1.52E-05
393	2.01E-10	0.000147	0.000147	7.4E-05	3.75E-07	1.49E-05
394	1.92E-10	0.000144	0.000144	7.25E-05	3.66E-07	1.45E-05
395	1.84E-10	0.000141	0.000141	7.1E-05	3.58E-07	1.42E-05
396	1.76E-10	0.000138	0.000138	6.95E-05	3.5E-07	1.39E-05
397	1.68E-10	0.000136	0.000136	6.81E-05	3.42E-07	1.36E-05
398	1.6E-10	0.000133	0.000133	6.67E-05	3.34E-07	1.32E-05
399	1.53E-10	0.00013	0.00013	6.53E-05	3.26E-07	1.29E-05
400	1.47E-10	0.000127	0.000127	6.39E-05	3.18E-07	1.26E-05
401	1.4E-10	0.000125	0.000125	6.26E-05	3.11E-07	1.23E-05
402	1.34E-10	0.000122	0.000122	6.13E-05	3.04E-07	1.21E-05
403	1.28E-10	0.00012	0.00012	6E-05	2.97E-07	1.18E-05
404	1.22E-10	0.000117	0.000117	5.88E-05	2.9E-07	1.15E-05
405	1.17E-10	0.000115	0.000115	5.76E-05	2.83E-07	1.12E-05

Son Embodiment 2, Peak Location, Second Sigmas

1st/2nd	1			
Stdv 1	0.4 B			
mean 1	4.059 B			
stdv 2	0.37 A			
mean 2	5.209 A			
L/d 30-70		32.6%	54.8%	
L/d 40-60		18.9%	31.1%	
L/d 80-140		21.5%	16.6%	
L/d 90-120		10.5%	8.2%	
SUM of dist	1.981623	1	0.024492	1

Aspect	Rati	m1	m2	m1 + m2	m/M	m/A	n/N
	1	4.35E-23	9.85E-44	4.35E-23	2.19E-23	4.35E-23	1.78E-21
	2	2.1E-16	2.42E-33	2.1E-16	1.06E-16	1.05E-16	4.28E-15
	3	4.24E-13	5.7E-28	4.24E-13	2.14E-13	1.41E-13	5.77E-12
	4	5.03E-11	1.78E-24	5.03E-11	2.54E-11	1.26E-11	5.13E-10
	5	1.43E-09	6.04E-22	1.43E-09	7.22E-10	2.86E-10	1.17E-08
	6	1.75E-08	5.39E-20	1.75E-08	8.85E-09	2.92E-09	1.19E-07
	7	1.24E-07	1.99E-18	1.24E-07	6.25E-08	1.77E-08	7.23E-07
	8	5.98E-07	3.92E-17	5.98E-07	3.02E-07	7.48E-08	3.05E-06
	9	2.19E-06	4.9E-16	2.19E-06	1.1E-06	2.43E-07	9.92E-06
	10	6.48E-06	4.3E-15	6.48E-06	3.27E-06	6.48E-07	2.64E-05
	11	1.63E-05	2.86E-14	1.63E-05	8.22E-06	1.48E-06	6.05E-05
	12	3.6E-05	1.52E-13	3.6E-05	1.82E-05	3E-06	0.000122
	13	7.16E-05	6.75E-13	7.16E-05	3.61E-05	5.51E-06	0.000225
	14	0.000131	2.57E-12	0.000131	6.59E-05	9.32E-06	0.000381
	15	0.000221	8.61E-12	0.000221	0.000112	1.48E-05	0.000603
	16	0.000353	2.58E-11	0.000353	0.000178	2.21E-05	0.000902
	17	0.000535	7.06E-11	0.000535	0.00027	3.15E-05	0.001286
	18	0.000775	1.78E-10	0.000775	0.000391	4.31E-05	0.001759
	19	0.00108	4.16E-10	0.00108	0.000545	5.69E-05	0.002322
	20	0.001455	9.14E-10	0.001455	0.000734	7.28E-05	0.002971
	21	0.001902	1.9E-09	0.001902	0.00096	9.06E-05	0.003699
	22	0.002422	3.75E-09	0.002422	0.001222	0.00011	0.004496
	23	0.003013	7.09E-09	0.003013	0.001521	0.000131	0.005349
	24	0.003671	1.29E-08	0.003671	0.001853	0.000153	0.006246
	25	0.00439	2.25E-08	0.00439	0.002215	0.000176	0.007169
	26	0.005161	3.8E-08	0.005161	0.002604	0.000199	0.008105
	27	0.005977	6.24E-08	0.005977	0.003016	0.000221	0.009038
	28	0.006827	9.95E-08	0.006827	0.003445	0.000244	0.009955

29	0.007701	1.55E-07	0.007701	0.003886	0.000266	0.010842
30	0.008588	2.35E-07	0.008588	0.004334	0.000286	0.011689
31	0.009478	3.49E-07	0.009479	0.004783	0.000306	0.012485
32	0.010362	5.09E-07	0.010363	0.005229	0.000324	0.013222
33	0.011229	7.28E-07	0.01123	0.005667	0.00034	0.013894
34	0.012071	1.02E-06	0.012072	0.006092	0.000355	0.014497
35	0.01288	1.41E-06	0.012882	0.006501	0.000368	0.015028
36	0.01365	1.93E-06	0.013652	0.006889	0.000379	0.015484
37	0.014374	2.59E-06	0.014377	0.007255	0.000389	0.015865
38	0.015047	3.43E-06	0.015051	0.007595	0.000396	0.016172
39	0.015667	4.49E-06	0.015671	0.007908	0.000402	0.016407
40	0.016229	5.82E-06	0.016235	0.008193	0.000406	0.016572
41	0.016732	7.45E-06	0.016739	0.008447	0.000408	0.01667
42	0.017175	9.44E-06	0.017184	0.008672	0.000409	0.016705
43	0.017556	1.19E-05	0.017568	0.008866	0.000409	0.016682
44	0.017878	1.47E-05	0.017893	0.009029	0.000407	0.016604
45	0.01814	1.82E-05	0.018158	0.009163	0.000404	0.016476
46	0.018344	2.22E-05	0.018366	0.009268	0.000399	0.016302
47	0.018491	2.7E-05	0.018518	0.009345	0.000394	0.016087
48	0.018585	3.25E-05	0.018617	0.009395	0.000388	0.015837
49	0.018627	3.89E-05	0.018666	0.009419	0.000381	0.015554
50	0.01862	4.62E-05	0.018666	0.00942	0.000373	0.015243
51	0.018567	5.46E-05	0.018622	0.009397	0.000365	0.014908
52	0.018472	6.41E-05	0.018536	0.009354	0.000356	0.014554
53	0.018336	7.48E-05	0.018411	0.009291	0.000347	0.014184
54	0.018164	8.69E-05	0.018251	0.00921	0.000338	0.0138
55	0.017959	0.0001	0.018059	0.009113	0.000328	0.013407
56	0.017723	0.000115	0.017838	0.009002	0.000319	0.013006
57	0.01746	0.000132	0.017592	0.008878	0.000309	0.012601
58	0.017173	0.00015	0.017323	0.008742	0.000299	0.012195
59	0.016864	0.00017	0.017034	0.008596	0.000289	0.011788
60	0.016536	0.000192	0.016728	0.008441	0.000279	0.011383
61	0.016191	0.000216	0.016407	0.00828	0.000269	0.010982
62	0.015833	0.000242	0.016075	0.008112	0.000259	0.010586
63	0.015464	0.00027	0.015734	0.00794	0.00025	0.010197
64	0.015085	0.0003	0.015385	0.007764	0.00024	0.009815
65	0.014699	0.000332	0.015031	0.007585	0.000231	0.009442
66	0.014307	0.000367	0.014674	0.007405	0.000222	0.009078
67	0.013912	0.000404	0.014316	0.007224	0.000214	0.008724
68	0.013514	0.000443	0.013957	0.007043	0.000205	0.008381
69	0.013116	0.000485	0.013601	0.006864	0.000197	0.008048
70	0.012718	0.000529	0.013248	0.006685	0.000189	0.007727
71	0.012323	0.000576	0.012899	0.006509	0.000182	0.007418
72	0.01193	0.000625	0.012555	0.006336	0.000174	0.00712

73	0.011541	0.000677	0.012218	0.006165	0.000167	0.006834
74	0.011156	0.000731	0.011888	0.005999	0.000161	0.006559
75	0.010778	0.000788	0.011565	0.005836	0.000154	0.006296
76	0.010405	0.000847	0.011252	0.005678	0.000148	0.006045
77	0.010039	0.000908	0.010947	0.005524	0.000142	0.005805
78	0.00968	0.000972	0.010653	0.005376	0.000137	0.005576
79	0.009329	0.001039	0.010368	0.005232	0.000131	0.005358
80	0.008986	0.001107	0.010093	0.005093	0.000126	0.005151
81	0.008651	0.001178	0.009829	0.00496	0.000121	0.004955
82	0.008325	0.001251	0.009576	0.004832	0.000117	0.004768
83	0.008007	0.001327	0.009333	0.00471	0.000112	0.004591
84	0.007698	0.001404	0.009102	0.004593	0.000108	0.004424
85	0.007398	0.001483	0.008881	0.004481	0.000104	0.004266
86	0.007106	0.001564	0.008671	0.004375	0.000101	0.004116
87	0.006824	0.001647	0.008471	0.004275	9.74E-05	0.003976
88	0.00655	0.001732	0.008282	0.00418	9.41E-05	0.003843
89	0.006286	0.001818	0.008104	0.00409	9.11E-05	0.003718
90	0.00603	0.001906	0.007936	0.004005	8.82E-05	0.0036
91	0.005783	0.001995	0.007778	0.003925	8.55E-05	0.00349
92	0.005544	0.002086	0.00763	0.00385	8.29E-05	0.003386
93	0.005313	0.002177	0.007491	0.00378	8.05E-05	0.003289
94	0.005091	0.00227	0.007361	0.003715	7.83E-05	0.003198
95	0.004877	0.002364	0.007241	0.003654	7.62E-05	0.003112
96	0.004671	0.002459	0.007129	0.003598	7.43E-05	0.003032
97	0.004472	0.002554	0.007026	0.003546	7.24E-05	0.002958
98	0.004281	0.00265	0.006931	0.003498	7.07E-05	0.002888
99	0.004098	0.002746	0.006844	0.003454	6.91E-05	0.002823
100	0.003921	0.002843	0.006764	0.003414	6.76E-05	0.002762
101	0.003752	0.00294	0.006692	0.003377	6.63E-05	0.002705
102	0.003589	0.003037	0.006626	0.003344	6.5E-05	0.002652
103	0.003432	0.003135	0.006567	0.003314	6.38E-05	0.002603
104	0.003282	0.003232	0.006514	0.003287	6.26E-05	0.002557
105	0.003138	0.003329	0.006467	0.003263	6.16E-05	0.002515
106	0.003	0.003425	0.006425	0.003243	6.06E-05	0.002475
107	0.002868	0.003522	0.006389	0.003224	5.97E-05	0.002438
108	0.002741	0.003617	0.006358	0.003209	5.89E-05	0.002404
109	0.002619	0.003712	0.006332	0.003195	5.81E-05	0.002372
110	0.002503	0.003807	0.006309	0.003184	5.74E-05	0.002342
111	0.002391	0.0039	0.006291	0.003175	5.67E-05	0.002314
112	0.002284	0.003993	0.006277	0.003168	5.6E-05	0.002288
113	0.002182	0.004084	0.006267	0.003162	5.55E-05	0.002264
114	0.002084	0.004175	0.006259	0.003159	5.49E-05	0.002242
115	0.001991	0.004264	0.006255	0.003156	5.44E-05	0.002221
116	0.001901	0.004352	0.006253	0.003156	5.39E-05	0.002201

117	0.001816	0.004439	0.006254	0.003156	5.35E-05	0.002183
118	0.001734	0.004524	0.006258	0.003158	5.3E-05	0.002165
119	0.001655	0.004607	0.006263	0.003161	5.26E-05	0.002149
120	0.001581	0.00469	0.00627	0.003164	5.23E-05	0.002133
121	0.001509	0.00477	0.006279	0.003169	5.19E-05	0.002119
122	0.001441	0.004849	0.006289	0.003174	5.16E-05	0.002105
123	0.001375	0.004926	0.006301	0.00318	5.12E-05	0.002092
124	0.001313	0.005001	0.006314	0.003186	5.09E-05	0.002079
125	0.001253	0.005074	0.006327	0.003193	5.06E-05	0.002067
126	0.001197	0.005145	0.006342	0.0032	5.03E-05	0.002055
127	0.001142	0.005215	0.006357	0.003208	5.01E-05	0.002044
128	0.00109	0.005282	0.006372	0.003216	4.98E-05	0.002033
129	0.001041	0.005347	0.006388	0.003224	4.95E-05	0.002022
130	0.000993	0.00541	0.006404	0.003232	4.93E-05	0.002011
131	0.000948	0.005472	0.00642	0.00324	4.9E-05	0.002001
132	0.000905	0.005531	0.006436	0.003248	4.88E-05	0.001991
133	0.000864	0.005587	0.006451	0.003256	4.85E-05	0.001981
134	0.000824	0.005642	0.006467	0.003263	4.83E-05	0.00197
135	0.000787	0.005695	0.006482	0.003271	4.8E-05	0.00196
136	0.000751	0.005745	0.006496	0.003278	4.78E-05	0.00195
137	0.000717	0.005793	0.00651	0.003285	4.75E-05	0.00194
138	0.000684	0.005839	0.006523	0.003292	4.73E-05	0.00193
139	0.000653	0.005883	0.006536	0.003298	4.7E-05	0.00192
140	0.000623	0.005924	0.006548	0.003304	4.68E-05	0.00191
141	0.000595	0.005963	0.006558	0.00331	4.65E-05	0.001899
142	0.000568	0.006	0.006568	0.003315	4.63E-05	0.001889
143	0.000542	0.006035	0.006577	0.003319	4.6E-05	0.001878
144	0.000518	0.006068	0.006585	0.003323	4.57E-05	0.001867
145	0.000494	0.006098	0.006592	0.003327	4.55E-05	0.001856
146	0.000472	0.006126	0.006598	0.00333	4.52E-05	0.001845
147	0.00045	0.006152	0.006603	0.003332	4.49E-05	0.001834
148	0.00043	0.006176	0.006606	0.003334	4.46E-05	0.001822
149	0.00041	0.006198	0.006608	0.003335	4.44E-05	0.001811
150	0.000392	0.006218	0.006609	0.003335	4.41E-05	0.001799
151	0.000374	0.006235	0.006609	0.003335	4.38E-05	0.001787
152	0.000357	0.006251	0.006608	0.003335	4.35E-05	0.001775
153	0.000341	0.006264	0.006605	0.003333	4.32E-05	0.001763
154	0.000326	0.006276	0.006601	0.003331	4.29E-05	0.00175
155	0.000311	0.006285	0.006596	0.003329	4.26E-05	0.001738
156	0.000297	0.006293	0.00659	0.003325	4.22E-05	0.001725
157	0.000284	0.006298	0.006582	0.003321	4.19E-05	0.001712
158	0.000271	0.006302	0.006573	0.003317	4.16E-05	0.001699
159	0.000259	0.006304	0.006562	0.003312	4.13E-05	0.001685
160	0.000247	0.006304	0.006551	0.003306	4.09E-05	0.001672

161	0.000236	0.006302	0.006538	0.003299	4.06E-05	0.001658
162	0.000225	0.006298	0.006524	0.003292	4.03E-05	0.001644
163	0.000215	0.006293	0.006508	0.003284	3.99E-05	0.00163
164	0.000206	0.006286	0.006492	0.003276	3.96E-05	0.001616
165	0.000196	0.006278	0.006474	0.003267	3.92E-05	0.001602
166	0.000188	0.006267	0.006455	0.003257	3.89E-05	0.001588
167	0.000179	0.006256	0.006435	0.003247	3.85E-05	0.001573
168	0.000171	0.006242	0.006414	0.003237	3.82E-05	0.001559
169	0.000164	0.006227	0.006391	0.003225	3.78E-05	0.001544
170	0.000156	0.006211	0.006368	0.003213	3.75E-05	0.001529
171	0.000149	0.006194	0.006343	0.003201	3.71E-05	0.001515
172	0.000143	0.006174	0.006317	0.003188	3.67E-05	0.0015
173	0.000136	0.006154	0.00629	0.003174	3.64E-05	0.001485
174	0.00013	0.006132	0.006263	0.00316	3.6E-05	0.00147
175	0.000125	0.006109	0.006234	0.003146	3.56E-05	0.001454
176	0.000119	0.006085	0.006204	0.003131	3.53E-05	0.001439
177	0.000114	0.00606	0.006173	0.003115	3.49E-05	0.001424
178	0.000109	0.006033	0.006142	0.003099	3.45E-05	0.001409
179	0.000104	0.006005	0.006109	0.003083	3.41E-05	0.001394
180	9.95E-05	0.005976	0.006076	0.003066	3.38E-05	0.001378
181	9.51E-05	0.005947	0.006042	0.003049	3.34E-05	0.001363
182	9.1E-05	0.005916	0.006007	0.003031	3.3E-05	0.001348
183	8.7E-05	0.005884	0.005971	0.003013	3.26E-05	0.001332
184	8.32E-05	0.005851	0.005934	0.002995	3.23E-05	0.001317
185	7.95E-05	0.005818	0.005897	0.002976	3.19E-05	0.001302
186	7.61E-05	0.005783	0.005859	0.002957	3.15E-05	0.001286
187	7.28E-05	0.005748	0.005821	0.002937	3.11E-05	0.001271
188	6.96E-05	0.005712	0.005781	0.002917	3.08E-05	0.001256
189	6.66E-05	0.005675	0.005742	0.002897	3.04E-05	0.00124
190	6.37E-05	0.005637	0.005701	0.002877	3E-05	0.001225
191	6.09E-05	0.005599	0.00566	0.002856	2.96E-05	0.00121
192	5.83E-05	0.00556	0.005619	0.002835	2.93E-05	0.001195
193	5.58E-05	0.005521	0.005576	0.002814	2.89E-05	0.00118
194	5.34E-05	0.005481	0.005534	0.002793	2.85E-05	0.001165
195	5.11E-05	0.00544	0.005491	0.002771	2.82E-05	0.00115
196	4.89E-05	0.005399	0.005448	0.002749	2.78E-05	0.001135
197	4.68E-05	0.005357	0.005404	0.002727	2.74E-05	0.00112
198	4.47E-05	0.005315	0.00536	0.002705	2.71E-05	0.001105
199	4.28E-05	0.005272	0.005315	0.002682	2.67E-05	0.001091
200	4.1E-05	0.005229	0.00527	0.00266	2.64E-05	0.001076
201	3.92E-05	0.005186	0.005225	0.002637	2.6E-05	0.001061
202	3.76E-05	0.005142	0.00518	0.002614	2.56E-05	0.001047
203	3.6E-05	0.005098	0.005134	0.002591	2.53E-05	0.001033
204	3.44E-05	0.005054	0.005088	0.002568	2.49E-05	0.001018

205	3.3E-05	0.005009	0.005042	0.002544	2.46E-05	0.001004
206	3.16E-05	0.004964	0.004996	0.002521	2.43E-05	0.00099
207	3.02E-05	0.004919	0.004949	0.002498	2.39E-05	0.000976
208	2.9E-05	0.004874	0.004903	0.002474	2.36E-05	0.000962
209	2.77E-05	0.004828	0.004856	0.00245	2.32E-05	0.000949
210	2.66E-05	0.004782	0.004809	0.002427	2.29E-05	0.000935
211	2.54E-05	0.004737	0.004762	0.002403	2.26E-05	0.000922
212	2.44E-05	0.004691	0.004715	0.002379	2.22E-05	0.000908
213	2.33E-05	0.004645	0.004668	0.002356	2.19E-05	0.000895
214	2.24E-05	0.004599	0.004621	0.002332	2.16E-05	0.000882
215	2.14E-05	0.004552	0.004574	0.002308	2.13E-05	0.000869
216	2.05E-05	0.004506	0.004527	0.002284	2.1E-05	0.000856
217	1.97E-05	0.00446	0.00448	0.002261	2.06E-05	0.000843
218	1.89E-05	0.004414	0.004433	0.002237	2.03E-05	0.00083
219	1.81E-05	0.004368	0.004386	0.002213	2E-05	0.000818
220	1.73E-05	0.004321	0.004339	0.00219	1.97E-05	0.000805
221	1.66E-05	0.004275	0.004292	0.002166	1.94E-05	0.000793
222	1.59E-05	0.004229	0.004245	0.002142	1.91E-05	0.000781
223	1.52E-05	0.004183	0.004199	0.002119	1.88E-05	0.000769
224	1.46E-05	0.004138	0.004152	0.002095	1.85E-05	0.000757
225	1.4E-05	0.004092	0.004106	0.002072	1.82E-05	0.000745
226	1.34E-05	0.004046	0.00406	0.002049	1.8E-05	0.000733
227	1.29E-05	0.004001	0.004014	0.002025	1.77E-05	0.000722
228	1.24E-05	0.003955	0.003968	0.002002	1.74E-05	0.000711
229	1.18E-05	0.00391	0.003922	0.001979	1.71E-05	0.000699
230	1.14E-05	0.003865	0.003876	0.001956	1.69E-05	0.000688
231	1.09E-05	0.00382	0.003831	0.001933	1.66E-05	0.000677
232	1.05E-05	0.003776	0.003786	0.001911	1.63E-05	0.000666
233	1E-05	0.003731	0.003741	0.001888	1.61E-05	0.000656
234	9.62E-06	0.003687	0.003697	0.001865	1.58E-05	0.000645
235	9.22E-06	0.003643	0.003652	0.001843	1.55E-05	0.000635
236	8.85E-06	0.003599	0.003608	0.001821	1.53E-05	0.000624
237	8.49E-06	0.003556	0.003564	0.001799	1.5E-05	0.000614
238	8.15E-06	0.003512	0.003521	0.001777	1.48E-05	0.000604
239	7.82E-06	0.003469	0.003477	0.001755	1.45E-05	0.000594
240	7.5E-06	0.003427	0.003434	0.001733	1.43E-05	0.000584
241	7.2E-06	0.003384	0.003391	0.001711	1.41E-05	0.000575
242	6.91E-06	0.003342	0.003349	0.00169	1.38E-05	0.000565
243	6.63E-06	0.0033	0.003307	0.001669	1.36E-05	0.000556
244	6.37E-06	0.003258	0.003265	0.001648	1.34E-05	0.000546
245	6.11E-06	0.003217	0.003223	0.001627	1.32E-05	0.000537
246	5.87E-06	0.003176	0.003182	0.001606	1.29E-05	0.000528
247	5.63E-06	0.003135	0.003141	0.001585	1.27E-05	0.000519
248	5.41E-06	0.003095	0.0031	0.001565	1.25E-05	0.00051

249	5.19E-06	0.003055	0.00306	0.001544	1.23E-05	0.000502
250	4.98E-06	0.003015	0.00302	0.001524	1.21E-05	0.000493
251	4.79E-06	0.002976	0.002981	0.001504	1.19E-05	0.000485
252	4.6E-06	0.002937	0.002941	0.001484	1.17E-05	0.000477
253	4.41E-06	0.002898	0.002902	0.001465	1.15E-05	0.000468
254	4.24E-06	0.00286	0.002864	0.001445	1.13E-05	0.00046
255	4.07E-06	0.002821	0.002826	0.001426	1.11E-05	0.000452
256	3.91E-06	0.002784	0.002788	0.001407	1.09E-05	0.000445
257	3.76E-06	0.002746	0.00275	0.001388	1.07E-05	0.000437
258	3.61E-06	0.002709	0.002713	0.001369	1.05E-05	0.000429
259	3.47E-06	0.002673	0.002676	0.00135	1.03E-05	0.000422
260	3.33E-06	0.002636	0.00264	0.001332	1.02E-05	0.000415
261	3.2E-06	0.0026	0.002603	0.001314	9.97E-06	0.000407
262	3.08E-06	0.002565	0.002568	0.001296	9.8E-06	0.0004
263	2.96E-06	0.002529	0.002532	0.001278	9.63E-06	0.000393
264	2.84E-06	0.002494	0.002497	0.00126	9.46E-06	0.000386
265	2.73E-06	0.00246	0.002462	0.001243	9.29E-06	0.000379
266	2.63E-06	0.002425	0.002428	0.001225	9.13E-06	0.000373
267	2.52E-06	0.002392	0.002394	0.001208	8.97E-06	0.000366
268	2.43E-06	0.002358	0.00236	0.001191	8.81E-06	0.00036
269	2.33E-06	0.002325	0.002327	0.001174	8.65E-06	0.000353
270	2.24E-06	0.002292	0.002294	0.001158	8.5E-06	0.000347
271	2.16E-06	0.00226	0.002262	0.001141	8.35E-06	0.000341
272	2.07E-06	0.002227	0.00223	0.001125	8.2E-06	0.000335
273	1.99E-06	0.002196	0.002198	0.001109	8.05E-06	0.000329
274	1.92E-06	0.002164	0.002166	0.001093	7.91E-06	0.000323
275	1.84E-06	0.002133	0.002135	0.001077	7.76E-06	0.000317
276	1.77E-06	0.002103	0.002104	0.001062	7.62E-06	0.000311
277	1.7E-06	0.002072	0.002074	0.001047	7.49E-06	0.000306
278	1.64E-06	0.002042	0.002044	0.001031	7.35E-06	0.0003
279	1.58E-06	0.002013	0.002014	0.001016	7.22E-06	0.000295
280	1.52E-06	0.001983	0.001985	0.001002	7.09E-06	0.000289
281	1.46E-06	0.001954	0.001956	0.000987	6.96E-06	0.000284
282	1.4E-06	0.001926	0.001927	0.000973	6.83E-06	0.000279
283	1.35E-06	0.001898	0.001899	0.000958	6.71E-06	0.000274
284	1.3E-06	0.00187	0.001871	0.000944	6.59E-06	0.000269
285	1.25E-06	0.001842	0.001843	0.00093	6.47E-06	0.000264
286	1.2E-06	0.001815	0.001816	0.000916	6.35E-06	0.000259
287	1.16E-06	0.001788	0.001789	0.000903	6.23E-06	0.000255
288	1.12E-06	0.001761	0.001762	0.000889	6.12E-06	0.00025
289	1.07E-06	0.001735	0.001736	0.000876	6.01E-06	0.000245
290	1.03E-06	0.001709	0.00171	0.000863	5.9E-06	0.000241
291	9.94E-07	0.001684	0.001685	0.00085	5.79E-06	0.000236
292	9.57E-07	0.001658	0.001659	0.000837	5.68E-06	0.000232

293	9.21E-07	0.001634	0.001634	0.000825	5.58E-06	0.000228
294	8.87E-07	0.001609	0.00161	0.000812	5.48E-06	0.000224
295	8.54E-07	0.001585	0.001585	0.0008	5.37E-06	0.000219
296	8.22E-07	0.001561	0.001561	0.000788	5.28E-06	0.000215
297	7.92E-07	0.001537	0.001538	0.000776	5.18E-06	0.000211
298	7.63E-07	0.001514	0.001514	0.000764	5.08E-06	0.000207
299	7.34E-07	0.001491	0.001491	0.000753	4.99E-06	0.000204
300	7.07E-07	0.001468	0.001469	0.000741	4.9E-06	0.0002
301	6.81E-07	0.001445	0.001446	0.00073	4.8E-06	0.000196
302	6.56E-07	0.001423	0.001424	0.000719	4.72E-06	0.000193
303	6.32E-07	0.001402	0.001402	0.000708	4.63E-06	0.000189
304	6.09E-07	0.00138	0.001381	0.000697	4.54E-06	0.000185
305	5.86E-07	0.001359	0.001359	0.000686	4.46E-06	0.000182
306	5.65E-07	0.001338	0.001338	0.000675	4.37E-06	0.000179
307	5.44E-07	0.001317	0.001318	0.000665	4.29E-06	0.000175
308	5.24E-07	0.001297	0.001297	0.000655	4.21E-06	0.000172
309	5.05E-07	0.001277	0.001277	0.000645	4.13E-06	0.000169
310	4.87E-07	0.001257	0.001257	0.000634	4.06E-06	0.000166
311	4.69E-07	0.001237	0.001238	0.000625	3.98E-06	0.000163
312	4.52E-07	0.001218	0.001218	0.000615	3.91E-06	0.000159
313	4.36E-07	0.001199	0.001199	0.000605	3.83E-06	0.000156
314	4.2E-07	0.00118	0.001181	0.000596	3.76E-06	0.000154
315	4.05E-07	0.001162	0.001162	0.000587	3.69E-06	0.000151
316	3.9E-07	0.001144	0.001144	0.000577	3.62E-06	0.000148
317	3.76E-07	0.001126	0.001126	0.000568	3.55E-06	0.000145
318	3.63E-07	0.001108	0.001108	0.000559	3.49E-06	0.000142
319	3.5E-07	0.001091	0.001091	0.000551	3.42E-06	0.00014
320	3.37E-07	0.001073	0.001074	0.000542	3.36E-06	0.000137
321	3.25E-07	0.001056	0.001057	0.000533	3.29E-06	0.000134
322	3.13E-07	0.00104	0.00104	0.000525	3.23E-06	0.000132
323	3.02E-07	0.001023	0.001024	0.000517	3.17E-06	0.000129
324	2.91E-07	0.001007	0.001007	0.000508	3.11E-06	0.000127
325	2.81E-07	0.000991	0.000991	0.0005	3.05E-06	0.000125
326	2.71E-07	0.000975	0.000976	0.000492	2.99E-06	0.000122
327	2.61E-07	0.00096	0.00096	0.000485	2.94E-06	0.00012
328	2.52E-07	0.000945	0.000945	0.000477	2.88E-06	0.000118
329	2.43E-07	0.00093	0.00093	0.000469	2.83E-06	0.000115
330	2.35E-07	0.000915	0.000915	0.000462	2.77E-06	0.000113
331	2.26E-07	0.0009	0.0009	0.000454	2.72E-06	0.000111
332	2.18E-07	0.000886	0.000886	0.000447	2.67E-06	0.000109
333	2.11E-07	0.000872	0.000872	0.00044	2.62E-06	0.000107
334	2.03E-07	0.000858	0.000858	0.000433	2.57E-06	0.000105
335	1.96E-07	0.000844	0.000844	0.000426	2.52E-06	0.000103
336	1.89E-07	0.00083	0.00083	0.000419	2.47E-06	0.000101

337	1.83E-07	0.000817	0.000817	0.000412	2.42E-06	9.9E-05
338	1.76E-07	0.000804	0.000804	0.000406	2.38E-06	9.71E-05
339	1.7E-07	0.000791	0.000791	0.000399	2.33E-06	9.53E-05
340	1.64E-07	0.000778	0.000778	0.000393	2.29E-06	9.35E-05
341	1.58E-07	0.000766	0.000766	0.000386	2.25E-06	9.17E-05
342	1.53E-07	0.000753	0.000753	0.00038	2.2E-06	8.99E-05
343	1.48E-07	0.000741	0.000741	0.000374	2.16E-06	8.82E-05
344	1.42E-07	0.000729	0.000729	0.000368	2.12E-06	8.65E-05
345	1.38E-07	0.000717	0.000717	0.000362	2.08E-06	8.49E-05
346	1.33E-07	0.000706	0.000706	0.000356	2.04E-06	8.33E-05
347	1.28E-07	0.000694	0.000694	0.00035	2E-06	8.17E-05
348	1.24E-07	0.000683	0.000683	0.000345	1.96E-06	8.01E-05
349	1.2E-07	0.000672	0.000672	0.000339	1.93E-06	7.86E-05
350	1.15E-07	0.000661	0.000661	0.000334	1.89E-06	7.71E-05
351	1.11E-07	0.00065	0.00065	0.000328	1.85E-06	7.56E-05
352	1.08E-07	0.000639	0.00064	0.000323	1.82E-06	7.42E-05
353	1.04E-07	0.000629	0.000629	0.000318	1.78E-06	7.28E-05
354	1E-07	0.000619	0.000619	0.000312	1.75E-06	7.14E-05
355	9.69E-08	0.000609	0.000609	0.000307	1.71E-06	7E-05
356	9.36E-08	0.000599	0.000599	0.000302	1.68E-06	6.87E-05
357	9.04E-08	0.000589	0.000589	0.000297	1.65E-06	6.74E-05
358	8.74E-08	0.000579	0.000579	0.000292	1.62E-06	6.61E-05
359	8.44E-08	0.00057	0.00057	0.000288	1.59E-06	6.48E-05
360	8.15E-08	0.000561	0.000561	0.000283	1.56E-06	6.36E-05
361	7.88E-08	0.000551	0.000551	0.000278	1.53E-06	6.24E-05
362	7.61E-08	0.000542	0.000542	0.000274	1.5E-06	6.12E-05
363	7.35E-08	0.000533	0.000533	0.000269	1.47E-06	6E-05
364	7.1E-08	0.000525	0.000525	0.000265	1.44E-06	5.89E-05
365	6.87E-08	0.000516	0.000516	0.00026	1.41E-06	5.77E-05
366	6.63E-08	0.000508	0.000508	0.000256	1.39E-06	5.66E-05
367	6.41E-08	0.000499	0.000499	0.000252	1.36E-06	5.55E-05
368	6.2E-08	0.000491	0.000491	0.000248	1.33E-06	5.45E-05
369	5.99E-08	0.000483	0.000483	0.000244	1.31E-06	5.34E-05
370	5.79E-08	0.000475	0.000475	0.00024	1.28E-06	5.24E-05
371	5.59E-08	0.000467	0.000467	0.000236	1.26E-06	5.14E-05
372	5.41E-08	0.000459	0.000459	0.000232	1.24E-06	5.04E-05
373	5.23E-08	0.000452	0.000452	0.000228	1.21E-06	4.95E-05
374	5.05E-08	0.000444	0.000444	0.000224	1.19E-06	4.85E-05
375	4.89E-08	0.000437	0.000437	0.000221	1.17E-06	4.76E-05
376	4.72E-08	0.00043	0.00043	0.000217	1.14E-06	4.67E-05
377	4.57E-08	0.000423	0.000423	0.000213	1.12E-06	4.58E-05
378	4.41E-08	0.000416	0.000416	0.00021	1.1E-06	4.49E-05
379	4.27E-08	0.000409	0.000409	0.000206	1.08E-06	4.41E-05
380	4.13E-08	0.000402	0.000402	0.000203	1.06E-06	4.32E-05

381	3.99E-08	0.000395	0.000396	0.0002	1.04E-06	4.24E-05
382	3.86E-08	0.000389	0.000389	0.000196	1.02E-06	4.16E-05
383	3.73E-08	0.000382	0.000383	0.000193	9.99E-07	4.08E-05
384	3.61E-08	0.000376	0.000376	0.00019	9.8E-07	4E-05
385	3.49E-08	0.00037	0.00037	0.000187	9.61E-07	3.92E-05
386	3.38E-08	0.000364	0.000364	0.000184	9.42E-07	3.85E-05
387	3.27E-08	0.000358	0.000358	0.000181	9.24E-07	3.77E-05
388	3.16E-08	0.000352	0.000352	0.000178	9.07E-07	3.7E-05
389	3.06E-08	0.000346	0.000346	0.000175	8.89E-07	3.63E-05
390	2.96E-08	0.00034	0.00034	0.000172	8.72E-07	3.56E-05
391	2.86E-08	0.000335	0.000335	0.000169	8.56E-07	3.49E-05
392	2.77E-08	0.000329	0.000329	0.000166	8.39E-07	3.43E-05
393	2.68E-08	0.000324	0.000324	0.000163	8.23E-07	3.36E-05
394	2.59E-08	0.000318	0.000318	0.000161	8.08E-07	3.3E-05
395	2.51E-08	0.000313	0.000313	0.000158	7.92E-07	3.23E-05
396	2.43E-08	0.000308	0.000308	0.000155	7.77E-07	3.17E-05
397	2.35E-08	0.000303	0.000303	0.000153	7.62E-07	3.11E-05
398	2.27E-08	0.000298	0.000298	0.00015	7.48E-07	3.05E-05
399	2.2E-08	0.000293	0.000293	0.000148	7.33E-07	2.99E-05
400	2.13E-08	0.000288	0.000288	0.000145	7.19E-07	2.94E-05
401	2.06E-08	0.000283	0.000283	0.000143	7.06E-07	2.88E-05
402	1.99E-08	0.000278	0.000278	0.00014	6.92E-07	2.83E-05
403	1.93E-08	0.000274	0.000274	0.000138	6.79E-07	2.77E-05
404	1.87E-08	0.000269	0.000269	0.000136	6.66E-07	2.72E-05
405	1.81E-08	0.000265	0.000265	0.000133	6.53E-07	2.67E-05

Son Embodiment 3, Peak Location

1st/2nd 2.333333
 Stdv 1 0.34 B
 mean 1 4.02 B
 stdv 2 0.34 A
 mean 2 5.17 A

L/d 30-70	51.0%	69.4%
L/d 40-60	30.9%	41.3%
L/d 80-140	17.5%	11.4%
L/d 90-120	8.2%	5.3%

SUM of dist	3.321845	1	0.050322	1
-------------	----------	---	----------	---

Aspect	Rati	m1	m2	m1 + m2	m/M	m/A	n/N
1	1.2E-30	7.25E-51	1.2E-30	3.62E-31	1.2E-30	2.39E-29	
2	2.21E-21	1.32E-38	2.21E-21	6.67E-22	1.11E-21	2.2E-20	
3	8.48E-17	2.85E-32	8.48E-17	2.55E-17	2.83E-17	5.61E-16	
4	6.39E-14	3.75E-28	6.39E-14	1.92E-14	1.6E-14	3.17E-13	
5	6.65E-12	3.6E-25	6.65E-12	2E-12	1.33E-12	2.64E-11	
6	2.15E-10	7.13E-23	2.15E-10	6.47E-11	3.58E-11	7.12E-10	
7	3.24E-09	4.99E-21	3.24E-09	9.76E-10	4.63E-10	9.21E-09	
8	2.88E-08	1.67E-19	2.88E-08	8.68E-09	3.6E-09	7.16E-08	
9	1.74E-07	3.27E-18	1.74E-07	5.25E-08	1.94E-08	3.85E-07	
10	7.88E-07	4.21E-17	7.88E-07	2.37E-07	7.88E-08	1.57E-06	
11	2.84E-06	3.91E-16	2.84E-06	8.54E-07	2.58E-07	5.12E-06	
12	8.53E-06	2.8E-15	8.53E-06	2.57E-06	7.11E-07	1.41E-05	
13	2.22E-05	1.61E-14	2.22E-05	6.68E-06	1.71E-06	3.39E-05	
14	5.11E-05	7.76E-14	5.11E-05	1.54E-05	3.65E-06	7.25E-05	
15	0.000107	3.22E-13	0.000107	3.21E-05	7.1E-06	0.000141	
16	0.000204	1.17E-12	0.000204	6.14E-05	1.28E-05	0.000253	
17	0.000364	3.81E-12	0.000364	0.000109	2.14E-05	0.000425	
18	0.000609	1.13E-11	0.000609	0.000183	3.38E-05	0.000672	
19	0.000966	3.06E-11	0.000966	0.000291	5.08E-05	0.00101	
20	0.001462	7.72E-11	0.001462	0.00044	7.31E-05	0.001453	
21	0.002124	1.82E-10	0.002124	0.000639	0.000101	0.00201	
22	0.002974	4.05E-10	0.002974	0.000895	0.000135	0.002687	
23	0.004032	8.55E-10	0.004032	0.001214	0.000175	0.003483	
24	0.005309	1.72E-09	0.005309	0.001598	0.000221	0.004396	
25	0.006812	3.31E-09	0.006812	0.002051	0.000272	0.005415	
26	0.008539	6.13E-09	0.008539	0.002571	0.000328	0.006527	
27	0.010481	1.1E-08	0.010481	0.003155	0.000388	0.007714	
28	0.01262	1.89E-08	0.01262	0.003799	0.000451	0.008956	

29	0.014934	3.18E-08	0.014934	0.004496	0.000515	0.010233
30	0.017395	5.18E-08	0.017395	0.005236	0.00058	0.011522
31	0.01997	8.25E-08	0.01997	0.006012	0.000644	0.012802
32	0.022626	1.28E-07	0.022626	0.006811	0.000707	0.014051
33	0.025324	1.95E-07	0.025324	0.007624	0.000767	0.01525
34	0.028029	2.9E-07	0.028029	0.008438	0.000824	0.016382
35	0.030704	4.24E-07	0.030705	0.009243	0.000877	0.017433
36	0.033316	6.09E-07	0.033316	0.010029	0.000925	0.018391
37	0.035832	8.6E-07	0.035833	0.010787	0.000968	0.019245
38	0.038224	1.2E-06	0.038225	0.011507	0.001006	0.01999
39	0.040468	1.64E-06	0.040469	0.012183	0.001038	0.02062
40	0.042541	2.22E-06	0.042544	0.012807	0.001064	0.021135
41	0.044428	2.96E-06	0.044431	0.013375	0.001084	0.021535
42	0.046115	3.91E-06	0.046119	0.013884	0.001098	0.021821
43	0.047593	5.1E-06	0.047598	0.014329	0.001107	0.021997
44	0.048856	6.58E-06	0.048863	0.014709	0.001111	0.022068
45	0.049902	8.4E-06	0.04991	0.015025	0.001109	0.02204
46	0.050732	1.06E-05	0.050743	0.015275	0.001103	0.021921
47	0.051349	1.33E-05	0.051363	0.015462	0.001093	0.021716
48	0.05176	1.66E-05	0.051776	0.015587	0.001079	0.021435
49	0.051972	2.04E-05	0.051992	0.015652	0.001061	0.021085
50	0.051994	2.5E-05	0.052019	0.01566	0.00104	0.020674
51	0.051838	3.03E-05	0.051868	0.015614	0.001017	0.02021
52	0.051516	3.65E-05	0.051552	0.015519	0.000991	0.019701
53	0.05104	4.37E-05	0.051083	0.015378	0.000964	0.019153
54	0.050422	5.2E-05	0.050474	0.015195	0.000935	0.018574
55	0.049678	6.15E-05	0.049739	0.014973	0.000904	0.017971
56	0.048818	7.24E-05	0.048891	0.014718	0.000873	0.017349
57	0.047858	8.46E-05	0.047942	0.014432	0.000841	0.016714
58	0.046808	9.84E-05	0.046907	0.014121	0.000809	0.016071
59	0.045683	0.000114	0.045797	0.013787	0.000776	0.015425
60	0.044493	0.000131	0.044624	0.013433	0.000744	0.014779
61	0.04325	0.00015	0.0434	0.013065	0.000711	0.014138
62	0.041964	0.000171	0.042135	0.012684	0.00068	0.013505
63	0.040645	0.000194	0.040839	0.012294	0.000648	0.012882
64	0.039302	0.00022	0.039522	0.011898	0.000618	0.012271
65	0.037944	0.000248	0.038191	0.011497	0.000588	0.011676
66	0.036577	0.000278	0.036855	0.011095	0.000558	0.011097
67	0.035211	0.000311	0.035521	0.010693	0.00053	0.010535
68	0.033849	0.000346	0.034195	0.010294	0.000503	0.009993
69	0.032499	0.000384	0.032883	0.009899	0.000477	0.00947
70	0.031164	0.000425	0.031589	0.00951	0.000451	0.008968
71	0.02985	0.000469	0.030319	0.009127	0.000427	0.008486
72	0.028559	0.000516	0.029075	0.008753	0.000404	0.008025

73	0.027296	0.000565	0.027861	0.008387	0.000382	0.007584
74	0.026062	0.000618	0.026681	0.008032	0.000361	0.007165
75	0.024861	0.000674	0.025535	0.007687	0.00034	0.006766
76	0.023694	0.000733	0.024427	0.007353	0.000321	0.006387
77	0.022562	0.000795	0.023357	0.007031	0.000303	0.006028
78	0.021467	0.00086	0.022326	0.006721	0.000286	0.005688
79	0.020409	0.000928	0.021336	0.006423	0.00027	0.005367
80	0.019388	0.000999	0.020387	0.006137	0.000255	0.005064
81	0.018406	0.001073	0.019479	0.005864	0.00024	0.004779
82	0.017462	0.00115	0.018612	0.005603	0.000227	0.00451
83	0.016555	0.00123	0.017785	0.005354	0.000214	0.004258
84	0.015686	0.001313	0.016999	0.005117	0.000202	0.004021
85	0.014854	0.001399	0.016253	0.004893	0.000191	0.0038
86	0.014059	0.001487	0.015546	0.00468	0.000181	0.003592
87	0.013299	0.001578	0.014877	0.004478	0.000171	0.003398
88	0.012573	0.001672	0.014245	0.004288	0.000162	0.003217
89	0.011882	0.001768	0.01365	0.004109	0.000153	0.003048
90	0.011224	0.001866	0.01309	0.00394	0.000145	0.00289
91	0.010597	0.001966	0.012564	0.003782	0.000138	0.002744
92	0.010001	0.002069	0.012071	0.003634	0.000131	0.002607
93	0.009436	0.002174	0.011609	0.003495	0.000125	0.002481
94	0.008898	0.00228	0.011178	0.003365	0.000119	0.002363
95	0.008389	0.002388	0.010777	0.003244	0.000113	0.002254
96	0.007906	0.002498	0.010403	0.003132	0.000108	0.002154
97	0.007448	0.002609	0.010057	0.003027	0.000104	0.00206
98	0.007015	0.002721	0.009736	0.002931	9.93E-05	0.001974
99	0.006605	0.002834	0.009439	0.002842	9.53E-05	0.001895
100	0.006217	0.002948	0.009166	0.002759	9.17E-05	0.001821
101	0.005851	0.003063	0.008914	0.002683	8.83E-05	0.001754
102	0.005505	0.003179	0.008683	0.002614	8.51E-05	0.001692
103	0.005178	0.003295	0.008472	0.002551	8.23E-05	0.001635
104	0.004869	0.003411	0.00828	0.002493	7.96E-05	0.001582
105	0.004578	0.003527	0.008105	0.00244	7.72E-05	0.001534
106	0.004303	0.003644	0.007947	0.002392	7.5E-05	0.00149
107	0.004045	0.00376	0.007804	0.002349	7.29E-05	0.001449
108	0.003801	0.003875	0.007676	0.002311	7.11E-05	0.001412
109	0.003571	0.003991	0.007562	0.002276	6.94E-05	0.001379
110	0.003354	0.004105	0.00746	0.002246	6.78E-05	0.001348
111	0.003151	0.004219	0.00737	0.002219	6.64E-05	0.001319
112	0.002959	0.004332	0.007291	0.002195	6.51E-05	0.001294
113	0.002778	0.004444	0.007222	0.002174	6.39E-05	0.00127
114	0.002609	0.004555	0.007163	0.002156	6.28E-05	0.001249
115	0.002449	0.004664	0.007113	0.002141	6.18E-05	0.001229
116	0.002299	0.004772	0.00707	0.002128	6.1E-05	0.001211

117	0.002158	0.004878	0.007035	0.002118	6.01E-05	0.001195
118	0.002025	0.004982	0.007007	0.002109	5.94E-05	0.00118
119	0.0019	0.005085	0.006985	0.002103	5.87E-05	0.001166
120	0.001783	0.005186	0.006969	0.002098	5.81E-05	0.001154
121	0.001673	0.005285	0.006958	0.002095	5.75E-05	0.001143
122	0.00157	0.005381	0.006951	0.002093	5.7E-05	0.001132
123	0.001473	0.005476	0.006948	0.002092	5.65E-05	0.001123
124	0.001382	0.005568	0.006949	0.002092	5.6E-05	0.001114
125	0.001296	0.005658	0.006954	0.002093	5.56E-05	0.001105
126	0.001216	0.005745	0.006961	0.002095	5.52E-05	0.001098
127	0.00114	0.00583	0.00697	0.002098	5.49E-05	0.001091
128	0.00107	0.005912	0.006981	0.002102	5.45E-05	0.001084
129	0.001003	0.005991	0.006995	0.002106	5.42E-05	0.001077
130	0.000941	0.006068	0.007009	0.00211	5.39E-05	0.001071
131	0.000883	0.006142	0.007025	0.002115	5.36E-05	0.001066
132	0.000828	0.006213	0.007041	0.00212	5.33E-05	0.00106
133	0.000776	0.006282	0.007058	0.002125	5.31E-05	0.001055
134	0.000728	0.006348	0.007076	0.00213	5.28E-05	0.001049
135	0.000683	0.00641	0.007093	0.002135	5.25E-05	0.001044
136	0.00064	0.00647	0.00711	0.002141	5.23E-05	0.001039
137	0.000601	0.006527	0.007128	0.002146	5.2E-05	0.001034
138	0.000563	0.006581	0.007144	0.002151	5.18E-05	0.001029
139	0.000528	0.006632	0.00716	0.002155	5.15E-05	0.001024
140	0.000496	0.00668	0.007175	0.00216	5.13E-05	0.001018
141	0.000465	0.006725	0.00719	0.002164	5.1E-05	0.001013
142	0.000436	0.006767	0.007203	0.002168	5.07E-05	0.001008
143	0.000409	0.006806	0.007215	0.002172	5.05E-05	0.001003
144	0.000384	0.006842	0.007226	0.002175	5.02E-05	0.000997
145	0.00036	0.006876	0.007235	0.002178	4.99E-05	0.000992
146	0.000337	0.006906	0.007244	0.002181	4.96E-05	0.000986
147	0.000317	0.006934	0.00725	0.002183	4.93E-05	0.00098
148	0.000297	0.006958	0.007255	0.002184	4.9E-05	0.000974
149	0.000279	0.00698	0.007259	0.002185	4.87E-05	0.000968
150	0.000261	0.006999	0.007261	0.002186	4.84E-05	0.000962
151	0.000245	0.007016	0.007261	0.002186	4.81E-05	0.000956
152	0.00023	0.007029	0.007259	0.002185	4.78E-05	0.000949
153	0.000216	0.00704	0.007256	0.002184	4.74E-05	0.000942
154	0.000203	0.007048	0.007251	0.002183	4.71E-05	0.000936
155	0.00019	0.007054	0.007244	0.002181	4.67E-05	0.000929
156	0.000178	0.007057	0.007235	0.002178	4.64E-05	0.000922
157	0.000167	0.007057	0.007225	0.002175	4.6E-05	0.000914
158	0.000157	0.007055	0.007213	0.002171	4.56E-05	0.000907
159	0.000147	0.007051	0.007199	0.002167	4.53E-05	0.0009
160	0.000138	0.007044	0.007183	0.002162	4.49E-05	0.000892

161	0.00013	0.007035	0.007165	0.002157	4.45E-05	0.000884
162	0.000122	0.007024	0.007146	0.002151	4.41E-05	0.000877
163	0.000115	0.00701	0.007125	0.002145	4.37E-05	0.000869
164	0.000108	0.006995	0.007102	0.002138	4.33E-05	0.000861
165	0.000101	0.006977	0.007078	0.002131	4.29E-05	0.000852
166	9.48E-05	0.006957	0.007052	0.002123	4.25E-05	0.000844
167	8.9E-05	0.006935	0.007024	0.002115	4.21E-05	0.000836
168	8.36E-05	0.006911	0.006995	0.002106	4.16E-05	0.000827
169	7.85E-05	0.006886	0.006964	0.002096	4.12E-05	0.000819
170	7.37E-05	0.006858	0.006932	0.002087	4.08E-05	0.00081
171	6.93E-05	0.006829	0.006898	0.002077	4.03E-05	0.000802
172	6.51E-05	0.006798	0.006863	0.002066	3.99E-05	0.000793
173	6.11E-05	0.006765	0.006826	0.002055	3.95E-05	0.000784
174	5.74E-05	0.006731	0.006788	0.002044	3.9E-05	0.000775
175	5.4E-05	0.006695	0.006749	0.002032	3.86E-05	0.000766
176	5.07E-05	0.006658	0.006709	0.00202	3.81E-05	0.000757
177	4.76E-05	0.006619	0.006667	0.002007	3.77E-05	0.000748
178	4.48E-05	0.006579	0.006624	0.001994	3.72E-05	0.000739
179	4.21E-05	0.006538	0.00658	0.001981	3.68E-05	0.00073
180	3.96E-05	0.006495	0.006535	0.001967	3.63E-05	0.000721
181	3.72E-05	0.006451	0.006488	0.001953	3.58E-05	0.000712
182	3.49E-05	0.006406	0.006441	0.001939	3.54E-05	0.000703
183	3.29E-05	0.00636	0.006393	0.001925	3.49E-05	0.000694
184	3.09E-05	0.006313	0.006344	0.00191	3.45E-05	0.000685
185	2.9E-05	0.006265	0.006294	0.001895	3.4E-05	0.000676
186	2.73E-05	0.006216	0.006243	0.001879	3.36E-05	0.000667
187	2.57E-05	0.006166	0.006192	0.001864	3.31E-05	0.000658
188	2.42E-05	0.006115	0.006139	0.001848	3.27E-05	0.000649
189	2.27E-05	0.006063	0.006086	0.001832	3.22E-05	0.00064
190	2.14E-05	0.006011	0.006032	0.001816	3.17E-05	0.000631
191	2.01E-05	0.005958	0.005978	0.0018	3.13E-05	0.000622
192	1.89E-05	0.005904	0.005923	0.001783	3.08E-05	0.000613
193	1.78E-05	0.00585	0.005868	0.001766	3.04E-05	0.000604
194	1.68E-05	0.005795	0.005812	0.00175	3E-05	0.000595
195	1.58E-05	0.00574	0.005755	0.001733	2.95E-05	0.000587
196	1.48E-05	0.005684	0.005699	0.001715	2.91E-05	0.000578
197	1.4E-05	0.005627	0.005641	0.001698	2.86E-05	0.000569
198	1.31E-05	0.005571	0.005584	0.001681	2.82E-05	0.00056
199	1.24E-05	0.005514	0.005526	0.001664	2.78E-05	0.000552
200	1.16E-05	0.005456	0.005468	0.001646	2.73E-05	0.000543
201	1.1E-05	0.005398	0.005409	0.001628	2.69E-05	0.000535
202	1.03E-05	0.005341	0.005351	0.001611	2.65E-05	0.000526
203	9.72E-06	0.005282	0.005292	0.001593	2.61E-05	0.000518
204	9.16E-06	0.005224	0.005233	0.001575	2.57E-05	0.00051

205	8.63E-06	0.005166	0.005174	0.001558	2.52E-05	0.000502
206	8.12E-06	0.005107	0.005115	0.00154	2.48E-05	0.000493
207	7.65E-06	0.005048	0.005056	0.001522	2.44E-05	0.000485
208	7.21E-06	0.00499	0.004997	0.001504	2.4E-05	0.000477
209	6.79E-06	0.004931	0.004938	0.001486	2.36E-05	0.000469
210	6.4E-06	0.004872	0.004878	0.001469	2.32E-05	0.000462
211	6.03E-06	0.004813	0.004819	0.001451	2.28E-05	0.000454
212	5.69E-06	0.004755	0.00476	0.001433	2.25E-05	0.000446
213	5.36E-06	0.004696	0.004701	0.001415	2.21E-05	0.000439
214	5.05E-06	0.004638	0.004643	0.001398	2.17E-05	0.000431
215	4.76E-06	0.004579	0.004584	0.00138	2.13E-05	0.000424
216	4.49E-06	0.004521	0.004526	0.001362	2.1E-05	0.000416
217	4.23E-06	0.004463	0.004467	0.001345	2.06E-05	0.000409
218	3.99E-06	0.004405	0.004409	0.001327	2.02E-05	0.000402
219	3.76E-06	0.004348	0.004351	0.00131	1.99E-05	0.000395
220	3.55E-06	0.00429	0.004294	0.001293	1.95E-05	0.000388
221	3.35E-06	0.004233	0.004237	0.001275	1.92E-05	0.000381
222	3.16E-06	0.004176	0.00418	0.001258	1.88E-05	0.000374
223	2.98E-06	0.00412	0.004123	0.001241	1.85E-05	0.000367
224	2.81E-06	0.004064	0.004066	0.001224	1.82E-05	0.000361
225	2.65E-06	0.004008	0.00401	0.001207	1.78E-05	0.000354
226	2.5E-06	0.003952	0.003955	0.00119	1.75E-05	0.000348
227	2.36E-06	0.003897	0.003899	0.001174	1.72E-05	0.000341
228	2.23E-06	0.003842	0.003844	0.001157	1.69E-05	0.000335
229	2.1E-06	0.003788	0.00379	0.001141	1.65E-05	0.000329
230	1.98E-06	0.003734	0.003736	0.001125	1.62E-05	0.000323
231	1.87E-06	0.00368	0.003682	0.001108	1.59E-05	0.000317
232	1.77E-06	0.003627	0.003628	0.001092	1.56E-05	0.000311
233	1.67E-06	0.003574	0.003575	0.001076	1.53E-05	0.000305
234	1.58E-06	0.003521	0.003523	0.001061	1.51E-05	0.000299
235	1.49E-06	0.003469	0.003471	0.001045	1.48E-05	0.000294
236	1.41E-06	0.003418	0.003419	0.001029	1.45E-05	0.000288
237	1.33E-06	0.003367	0.003368	0.001014	1.42E-05	0.000282
238	1.25E-06	0.003316	0.003317	0.000999	1.39E-05	0.000277
239	1.19E-06	0.003266	0.003267	0.000984	1.37E-05	0.000272
240	1.12E-06	0.003216	0.003218	0.000969	1.34E-05	0.000266
241	1.06E-06	0.003167	0.003168	0.000954	1.31E-05	0.000261
242	9.99E-07	0.003119	0.00312	0.000939	1.29E-05	0.000256
243	9.44E-07	0.00307	0.003071	0.000925	1.26E-05	0.000251
244	8.93E-07	0.003023	0.003024	0.00091	1.24E-05	0.000246
245	8.44E-07	0.002975	0.002976	0.000896	1.21E-05	0.000241
246	7.97E-07	0.002929	0.00293	0.000882	1.19E-05	0.000237
247	7.54E-07	0.002883	0.002883	0.000868	1.17E-05	0.000232
248	7.13E-07	0.002837	0.002838	0.000854	1.14E-05	0.000227

249	6.74E-07	0.002792	0.002792	0.000841	1.12E-05	0.000223
250	6.37E-07	0.002747	0.002748	0.000827	1.1E-05	0.000218
251	6.02E-07	0.002703	0.002704	0.000814	1.08E-05	0.000214
252	5.7E-07	0.002659	0.00266	0.000801	1.06E-05	0.00021
253	5.39E-07	0.002616	0.002617	0.000788	1.03E-05	0.000206
254	5.1E-07	0.002574	0.002574	0.000775	1.01E-05	0.000201
255	4.82E-07	0.002532	0.002532	0.000762	9.93E-06	0.000197
256	4.56E-07	0.00249	0.00249	0.00075	9.73E-06	0.000193
257	4.31E-07	0.002449	0.002449	0.000737	9.53E-06	0.000189
258	4.08E-07	0.002408	0.002409	0.000725	9.34E-06	0.000186
259	3.86E-07	0.002368	0.002369	0.000713	9.15E-06	0.000182
260	3.66E-07	0.002329	0.002329	0.000701	8.96E-06	0.000178
261	3.46E-07	0.00229	0.00229	0.000689	8.78E-06	0.000174
262	3.28E-07	0.002252	0.002252	0.000678	8.59E-06	0.000171
263	3.1E-07	0.002214	0.002214	0.000666	8.42E-06	0.000167
264	2.93E-07	0.002176	0.002176	0.000655	8.24E-06	0.000164
265	2.78E-07	0.002139	0.002139	0.000644	8.07E-06	0.00016
266	2.63E-07	0.002103	0.002103	0.000633	7.91E-06	0.000157
267	2.49E-07	0.002067	0.002067	0.000622	7.74E-06	0.000154
268	2.36E-07	0.002031	0.002032	0.000612	7.58E-06	0.000151
269	2.23E-07	0.001996	0.001997	0.000601	7.42E-06	0.000148
270	2.12E-07	0.001962	0.001962	0.000591	7.27E-06	0.000144
271	2E-07	0.001928	0.001928	0.00058	7.12E-06	0.000141
272	1.9E-07	0.001895	0.001895	0.00057	6.97E-06	0.000138
273	1.8E-07	0.001862	0.001862	0.00056	6.82E-06	0.000136
274	1.7E-07	0.001829	0.001829	0.000551	6.68E-06	0.000133
275	1.61E-07	0.001797	0.001797	0.000541	6.54E-06	0.00013
276	1.53E-07	0.001766	0.001766	0.000532	6.4E-06	0.000127
277	1.45E-07	0.001734	0.001735	0.000522	6.26E-06	0.000124
278	1.37E-07	0.001704	0.001704	0.000513	6.13E-06	0.000122
279	1.3E-07	0.001674	0.001674	0.000504	6E-06	0.000119
280	1.23E-07	0.001644	0.001644	0.000495	5.87E-06	0.000117
281	1.17E-07	0.001615	0.001615	0.000486	5.75E-06	0.000114
282	1.11E-07	0.001586	0.001586	0.000477	5.62E-06	0.000112
283	1.05E-07	0.001558	0.001558	0.000469	5.5E-06	0.000109
284	9.98E-08	0.00153	0.00153	0.000461	5.39E-06	0.000107
285	9.46E-08	0.001502	0.001502	0.000452	5.27E-06	0.000105
286	8.97E-08	0.001475	0.001475	0.000444	5.16E-06	0.000102
287	8.51E-08	0.001448	0.001449	0.000436	5.05E-06	0.0001
288	8.07E-08	0.001422	0.001422	0.000428	4.94E-06	9.81E-05
289	7.66E-08	0.001396	0.001397	0.00042	4.83E-06	9.6E-05
290	7.26E-08	0.001371	0.001371	0.000413	4.73E-06	9.4E-05
291	6.89E-08	0.001346	0.001346	0.000405	4.63E-06	9.19E-05
292	6.54E-08	0.001322	0.001322	0.000398	4.53E-06	8.99E-05

293	6.2E-08	0.001297	0.001297	0.000391	4.43E-06	8.8E-05
294	5.89E-08	0.001274	0.001274	0.000383	4.33E-06	8.61E-05
295	5.59E-08	0.00125	0.00125	0.000376	4.24E-06	8.42E-05
296	5.3E-08	0.001227	0.001227	0.000369	4.15E-06	8.24E-05
297	5.03E-08	0.001205	0.001205	0.000363	4.06E-06	8.06E-05
298	4.78E-08	0.001182	0.001182	0.000356	3.97E-06	7.88E-05
299	4.54E-08	0.00116	0.001161	0.000349	3.88E-06	7.71E-05
300	4.31E-08	0.001139	0.001139	0.000343	3.8E-06	7.54E-05
301	4.09E-08	0.001118	0.001118	0.000337	3.71E-06	7.38E-05
302	3.88E-08	0.001097	0.001097	0.00033	3.63E-06	7.22E-05
303	3.69E-08	0.001077	0.001077	0.000324	3.55E-06	7.06E-05
304	3.5E-08	0.001057	0.001057	0.000318	3.48E-06	6.91E-05
305	3.33E-08	0.001037	0.001037	0.000312	3.4E-06	6.76E-05
306	3.16E-08	0.001017	0.001017	0.000306	3.32E-06	6.61E-05
307	3E-08	0.000998	0.000998	0.000301	3.25E-06	6.46E-05
308	2.85E-08	0.00098	0.00098	0.000295	3.18E-06	6.32E-05
309	2.71E-08	0.000961	0.000961	0.000289	3.11E-06	6.18E-05
310	2.57E-08	0.000943	0.000943	0.000284	3.04E-06	6.04E-05
311	2.44E-08	0.000925	0.000925	0.000279	2.97E-06	5.91E-05
312	2.32E-08	0.000908	0.000908	0.000273	2.91E-06	5.78E-05
313	2.21E-08	0.000891	0.000891	0.000268	2.85E-06	5.65E-05
314	2.1E-08	0.000874	0.000874	0.000263	2.78E-06	5.53E-05
315	1.99E-08	0.000857	0.000857	0.000258	2.72E-06	5.41E-05
316	1.9E-08	0.000841	0.000841	0.000253	2.66E-06	5.29E-05
317	1.8E-08	0.000825	0.000825	0.000248	2.6E-06	5.17E-05
318	1.71E-08	0.000809	0.000809	0.000244	2.54E-06	5.06E-05
319	1.63E-08	0.000794	0.000794	0.000239	2.49E-06	4.94E-05
320	1.55E-08	0.000778	0.000778	0.000234	2.43E-06	4.83E-05
321	1.47E-08	0.000764	0.000764	0.00023	2.38E-06	4.73E-05
322	1.4E-08	0.000749	0.000749	0.000225	2.33E-06	4.62E-05
323	1.33E-08	0.000735	0.000735	0.000221	2.27E-06	4.52E-05
324	1.27E-08	0.00072	0.000721	0.000217	2.22E-06	4.42E-05
325	1.2E-08	0.000707	0.000707	0.000213	2.17E-06	4.32E-05
326	1.15E-08	0.000693	0.000693	0.000209	2.13E-06	4.22E-05
327	1.09E-08	0.00068	0.00068	0.000205	2.08E-06	4.13E-05
328	1.04E-08	0.000667	0.000667	0.000201	2.03E-06	4.04E-05
329	9.87E-09	0.000654	0.000654	0.000197	1.99E-06	3.95E-05
330	9.39E-09	0.000641	0.000641	0.000193	1.94E-06	3.86E-05
331	8.94E-09	0.000629	0.000629	0.000189	1.9E-06	3.77E-05
332	8.5E-09	0.000617	0.000617	0.000186	1.86E-06	3.69E-05
333	8.09E-09	0.000605	0.000605	0.000182	1.82E-06	3.61E-05
334	7.7E-09	0.000593	0.000593	0.000178	1.78E-06	3.53E-05
335	7.33E-09	0.000581	0.000581	0.000175	1.74E-06	3.45E-05
336	6.98E-09	0.00057	0.00057	0.000172	1.7E-06	3.37E-05

337	6.65E-09	0.000559	0.000559	0.000168	1.66E-06	3.3E-05
338	6.33E-09	0.000548	0.000548	0.000165	1.62E-06	3.22E-05
339	6.02E-09	0.000537	0.000537	0.000162	1.59E-06	3.15E-05
340	5.74E-09	0.000527	0.000527	0.000159	1.55E-06	3.08E-05
341	5.46E-09	0.000517	0.000517	0.000156	1.52E-06	3.01E-05
342	5.2E-09	0.000507	0.000507	0.000152	1.48E-06	2.94E-05
343	4.95E-09	0.000497	0.000497	0.00015	1.45E-06	2.88E-05
344	4.72E-09	0.000487	0.000487	0.000147	1.42E-06	2.81E-05
345	4.49E-09	0.000477	0.000477	0.000144	1.38E-06	2.75E-05
346	4.28E-09	0.000468	0.000468	0.000141	1.35E-06	2.69E-05
347	4.08E-09	0.000459	0.000459	0.000138	1.32E-06	2.63E-05
348	3.89E-09	0.00045	0.00045	0.000135	1.29E-06	2.57E-05
349	3.7E-09	0.000441	0.000441	0.000133	1.26E-06	2.51E-05
350	3.53E-09	0.000432	0.000432	0.00013	1.24E-06	2.45E-05
351	3.36E-09	0.000424	0.000424	0.000128	1.21E-06	2.4E-05
352	3.2E-09	0.000415	0.000415	0.000125	1.18E-06	2.35E-05
353	3.05E-09	0.000407	0.000407	0.000123	1.15E-06	2.29E-05
354	2.91E-09	0.000399	0.000399	0.00012	1.13E-06	2.24E-05
355	2.77E-09	0.000391	0.000391	0.000118	1.1E-06	2.19E-05
356	2.64E-09	0.000384	0.000384	0.000115	1.08E-06	2.14E-05
357	2.52E-09	0.000376	0.000376	0.000113	1.05E-06	2.09E-05
358	2.4E-09	0.000369	0.000369	0.000111	1.03E-06	2.05E-05
359	2.29E-09	0.000361	0.000361	0.000109	1.01E-06	2E-05
360	2.18E-09	0.000354	0.000354	0.000107	9.84E-07	1.96E-05
361	2.08E-09	0.000347	0.000347	0.000105	9.62E-07	1.91E-05
362	1.99E-09	0.00034	0.00034	0.000102	9.4E-07	1.87E-05
363	1.89E-09	0.000334	0.000334	0.0001	9.19E-07	1.83E-05
364	1.81E-09	0.000327	0.000327	9.84E-05	8.98E-07	1.79E-05
365	1.72E-09	0.00032	0.00032	9.65E-05	8.78E-07	1.74E-05
366	1.64E-09	0.000314	0.000314	9.46E-05	8.58E-07	1.71E-05
367	1.57E-09	0.000308	0.000308	9.27E-05	8.39E-07	1.67E-05
368	1.49E-09	0.000302	0.000302	9.08E-05	8.2E-07	1.63E-05
369	1.43E-09	0.000296	0.000296	8.9E-05	8.02E-07	1.59E-05
370	1.36E-09	0.00029	0.00029	8.73E-05	7.84E-07	1.56E-05
371	1.3E-09	0.000284	0.000284	8.55E-05	7.66E-07	1.52E-05
372	1.24E-09	0.000278	0.000278	8.38E-05	7.49E-07	1.49E-05
373	1.18E-09	0.000273	0.000273	8.22E-05	7.32E-07	1.45E-05
374	1.13E-09	0.000268	0.000268	8.05E-05	7.15E-07	1.42E-05
375	1.08E-09	0.000262	0.000262	7.89E-05	6.99E-07	1.39E-05
376	1.03E-09	0.000257	0.000257	7.74E-05	6.83E-07	1.36E-05
377	9.81E-10	0.000252	0.000252	7.58E-05	6.68E-07	1.33E-05
378	9.36E-10	0.000247	0.000247	7.43E-05	6.53E-07	1.3E-05
379	8.94E-10	0.000242	0.000242	7.28E-05	6.38E-07	1.27E-05
380	8.53E-10	0.000237	0.000237	7.14E-05	6.24E-07	1.24E-05

381	8.15E-10	0.000232	0.000232	6.99E-05	6.1E-07	1.21E-05
382	7.78E-10	0.000228	0.000228	6.85E-05	5.96E-07	1.18E-05
383	7.43E-10	0.000223	0.000223	6.72E-05	5.83E-07	1.16E-05
384	7.09E-10	0.000219	0.000219	6.58E-05	5.69E-07	1.13E-05
385	6.77E-10	0.000214	0.000214	6.45E-05	5.57E-07	1.11E-05
386	6.47E-10	0.00021	0.00021	6.32E-05	5.44E-07	1.08E-05
387	6.18E-10	0.000206	0.000206	6.2E-05	5.32E-07	1.06E-05
388	5.9E-10	0.000202	0.000202	6.07E-05	5.2E-07	1.03E-05
389	5.64E-10	0.000198	0.000198	5.95E-05	5.08E-07	1.01E-05
390	5.39E-10	0.000194	0.000194	5.83E-05	4.97E-07	9.87E-06
391	5.14E-10	0.00019	0.00019	5.71E-05	4.85E-07	9.65E-06
392	4.92E-10	0.000186	0.000186	5.6E-05	4.75E-07	9.43E-06
393	4.7E-10	0.000182	0.000182	5.49E-05	4.64E-07	9.22E-06
394	4.49E-10	0.000179	0.000179	5.38E-05	4.53E-07	9.01E-06
395	4.29E-10	0.000175	0.000175	5.27E-05	4.43E-07	8.81E-06
396	4.1E-10	0.000172	0.000172	5.16E-05	4.33E-07	8.61E-06
397	3.92E-10	0.000168	0.000168	5.06E-05	4.23E-07	8.42E-06
398	3.74E-10	0.000165	0.000165	4.96E-05	4.14E-07	8.23E-06
399	3.58E-10	0.000161	0.000161	4.86E-05	4.05E-07	8.04E-06
400	3.42E-10	0.000158	0.000158	4.76E-05	3.96E-07	7.86E-06
401	3.27E-10	0.000155	0.000155	4.67E-05	3.87E-07	7.68E-06
402	3.12E-10	0.000152	0.000152	4.57E-05	3.78E-07	7.51E-06
403	2.99E-10	0.000149	0.000149	4.48E-05	3.69E-07	7.34E-06
404	2.86E-10	0.000146	0.000146	4.39E-05	3.61E-07	7.18E-06
405	2.73E-10	0.000143	0.000143	4.3E-05	3.53E-07	7.01E-06

Son Embodiment 3, Average

1st/2nd 2.333333333
Stdv 1 0.34
mean 1 3.856
stdv 2 0.34
mean 2 4.9545

L/d 30-70	56.4%
L/d 40-60	32.9%
L/d 80-140	17.7%
L/d 90-120	8.8%

SUM of dist	0.998656683	0.998574	50.0	150.0	3.32877322	1
Av Asp Rat						

Aspect Ratio	m1	m2	(L/d)*m1	(L/d)*m2	m1 + m2	m/M
1	1.37681E-28	9.09E-47	1.37681E-28	9.09366E-47	3.21255E-28	9.65E-29
2	9.4759E-20	4.54E-35	1.89518E-19	9.07991E-35	2.21104E-19	6.64E-20
3	2.03997E-15	4.61E-29	6.1199E-15	1.38197E-28	4.75993E-15	1.43E-15
4	1.0218E-12	3.55E-25	4.08721E-12	1.42044E-24	2.3842E-12	7.16E-13
5	7.75054E-11	2.25E-22	3.87527E-10	1.12252E-21	1.80846E-10	5.43E-11
6	1.93425E-09	3.17E-20	1.16055E-08	1.90101E-19	4.51324E-09	1.36E-09
7	2.34629E-08	1.66E-18	1.6424E-07	1.16404E-17	5.47467E-08	1.64E-08
8	1.72628E-07	4.35E-17	1.38103E-06	3.48149E-16	4.02799E-07	1.21E-07
9	8.8312E-07	6.82E-16	7.94808E-06	6.13632E-15	2.06061E-06	6.19E-07
10	3.43555E-06	7.22E-15	3.43555E-05	7.21867E-14	8.01629E-06	2.41E-06
11	1.08086E-05	5.62E-14	0.000118894	6.17959E-13	2.522E-05	7.58E-06
12	2.87342E-05	3.41E-13	0.000344811	4.09702E-12	6.70465E-05	2.01E-05
13	6.6666E-05	1.69E-12	0.000866658	2.20326E-11	0.000155554	4.67E-05
14	0.000138309	7.11E-12	0.001936324	9.95483E-11	0.000322721	9.69E-05
15	0.000261441	2.59E-11	0.003921616	3.88373E-10	0.000610029	0.000183
16	0.000456937	8.36E-11	0.007310993	1.33692E-09	0.001066187	0.00032
17	0.000747103	2.43E-10	0.012700743	4.13192E-09	0.001743239	0.000524
18	0.001153585	6.46E-10	0.020764531	1.16288E-08	0.002691699	0.000809
19	0.001695194	1.59E-09	0.032208678	3.0152E-08	0.003955453	0.001188
20	0.002385947	3.64E-09	0.047718931	7.27306E-08	0.005567212	0.001672
21	0.003233595	7.84E-09	0.067905485	1.64545E-07	0.007545062	0.002267
22	0.00423876	1.6E-08	0.09325271	3.51581E-07	0.009890455	0.002971
23	0.005394728	3.1E-08	0.124078736	7.13692E-07	0.012587729	0.003781
24	0.006687843	5.76E-08	0.160508243	1.38341E-06	0.015605026	0.004688
25	0.008098394	1.03E-07	0.202459859	2.57195E-06	0.018896356	0.005677
26	0.009601841	1.77E-07	0.249647878	4.60375E-06	0.022404474	0.006731
27	0.011170245	2.95E-07	0.301596617	7.9609E-06	0.0260642	0.00783

28	0.012773747	4.76E-07	0.357664919	1.33382E-05	0.029805886	0.008954
29	0.014381994	7.49E-07	0.417077819	2.17099E-05	0.033558734	0.010081
30	0.015965413	1.15E-06	0.478962382	3.44074E-05	0.037253777	0.011191
31	0.017496288	1.72E-06	0.542384935	5.32083E-05	0.040826389	0.012265
32	0.018949604	2.51E-06	0.606387322	8.04352E-05	0.044218256	0.013284
33	0.020303647	3.61E-06	0.670020347	0.000119063	0.047378784	0.014233
34	0.021540384	5.08E-06	0.73237307	0.000172831	0.05026598	0.0151
35	0.022645633	7.04E-06	0.79259717	0.000246361	0.05284685	0.015876
36	0.023609055	9.59E-06	0.849925991	0.00034527	0.055097387	0.016552
37	0.024424008	1.29E-05	0.903688283	0.000476288	0.057002224	0.017124
38	0.025087287	1.7E-05	0.95331691	0.000647361	0.058554039	0.01759
39	0.025598795	2.22E-05	0.998353006	0.000867745	0.059752772	0.01795
40	0.025961154	2.87E-05	1.038446179	0.001148092	0.060604729	0.018206
41	0.026179303	3.66E-05	1.07335142	0.001500511	0.061121638	0.018362
42	0.026260081	4.62E-05	1.10292339	0.001938614	0.061319679	0.018421
43	0.026211831	5.76E-05	1.127108747	0.002477539	0.061218557	0.018391
44	0.026044025	7.12E-05	1.145937087	0.003133946	0.060840617	0.018277
45	0.025766912	8.72E-05	1.159511047	0.003925991	0.060210039	0.018088
46	0.025391218	0.000106	1.167996025	0.004873277	0.059352116	0.01783
47	0.02492787	0.000128	1.171609876	0.005996768	0.05829262	0.017512
48	0.024387769	0.000152	1.170612911	0.00731869	0.057057267	0.017141
49	0.0237816	0.000181	1.165298404	0.008862402	0.055671266	0.016724
50	0.023119676	0.000213	1.15598379	0.010652244	0.054158955	0.01627
51	0.022411817	0.000249	1.143002662	0.012713366	0.052543521	0.015785
52	0.021667262	0.00029	1.126697623	0.015071541	0.050846782	0.015275
53	0.020894604	0.000335	1.107414029	0.01775296	0.049089038	0.014747
54	0.020101752	0.000385	1.085494612	0.020784015	0.047288977	0.014206
55	0.019295908	0.00044	1.061274952	0.024191077	0.045463624	0.013658
56	0.018483567	0.0005	1.03507976	0.028000264	0.043628328	0.013106
57	0.017670525	0.000566	1.007219902	0.032237208	0.041796789	0.012556
58	0.016861898	0.000637	0.977990108	0.036926828	0.039981099	0.012011
59	0.016062157	0.000713	0.947667281	0.042093095	0.038191809	0.011473
60	0.015275156	0.000796	0.916509361	0.047758821	0.036438011	0.010946
61	0.014504174	0.000884	0.884754636	0.053945437	0.034727425	0.010432
62	0.013751959	0.000979	0.852621471	0.060672806	0.033066498	0.009934
63	0.013020768	0.001079	0.820308363	0.067959028	0.031460506	0.009451
64	0.012312411	0.001185	0.787994278	0.075820277	0.02991365	0.008986
65	0.011628296	0.001296	0.75583921	0.084270647	0.028429161	0.00854
66	0.010969469	0.001414	0.723984922	0.093322022	0.027009397	0.008114
67	0.010336654	0.001537	0.692555816	0.102983959	0.025655933	0.007707
68	0.009730293	0.001666	0.661659906	0.113263601	0.024369658	0.007321
69	0.009150578	0.0018	0.631389849	0.124165599	0.023150849	0.006955
70	0.008597486	0.001938	0.601824022	0.135692063	0.021999259	0.006609
71	0.008070811	0.002082	0.573027614	0.147842534	0.020914183	0.006283

72	0.00757019	0.002231	0.545053707	0.160613968	0.019894527	0.005977
73	0.007095128	0.002384	0.517944349	0.174000747	0.018938871	0.005689
74	0.006645021	0.00254	0.49173159	0.187994708	0.018045519	0.005421
75	0.00621918	0.002701	0.46643848	0.202585184	0.017212555	0.005171
76	0.005816842	0.002865	0.44208002	0.217759067	0.016437883	0.004938
77	0.005437196	0.003032	0.418664057	0.233500886	0.015719269	0.004722
78	0.005079386	0.003202	0.396192132	0.249792896	0.015054374	0.004522
79	0.004742535	0.003375	0.374660265	0.266615179	0.014440791	0.004338
80	0.004425746	0.003549	0.354059681	0.283945765	0.013876063	0.004169
81	0.004128117	0.003725	0.334377483	0.301760749	0.013357715	0.004013
82	0.003848747	0.003903	0.315597265	0.32003443	0.012883269	0.00387
83	0.003586743	0.004081	0.297699674	0.338739446	0.012450265	0.00374
84	0.003341225	0.00426	0.280662917	0.357846923	0.012056275	0.003622
85	0.003111332	0.004439	0.264463219	0.377326622	0.011698911	0.003514
86	0.002896224	0.004618	0.249075234	0.397147093	0.011375845	0.003417
87	0.002695085	0.004796	0.23447241	0.417275832	0.011084806	0.00333
88	0.002507129	0.004974	0.220627318	0.43767943	0.010823597	0.003252
89	0.002331595	0.00515	0.207511937	0.458323734	0.010590093	0.003181
90	0.002167755	0.005324	0.195097906	0.479173996	0.010382249	0.003119
91	0.002014909	0.005497	0.183356746	0.500195025	0.010198104	0.003064
92	0.001872392	0.005667	0.172260048	0.521351335	0.010035777	0.003015
93	0.001739566	0.005834	0.161779639	0.542607287	0.009893474	0.002972
94	0.001615827	0.005999	0.151887716	0.56392723	0.009769488	0.002935
95	0.0015006	0.006161	0.142556972	0.585275631	0.009662195	0.002903
96	0.00139334	0.006319	0.133760683	0.606617205	0.009570057	0.002875
97	0.001293534	0.006473	0.125472797	0.627917035	0.009491617	0.002851
98	0.001200694	0.006624	0.117667991	0.649140688	0.009425503	0.002832
99	0.001114361	0.00677	0.110321729	0.670254319	0.009370421	0.002815
100	0.001034103	0.006912	0.10341029	0.691224777	0.009325155	0.002801
101	0.000959513	0.00705	0.096910805	0.712019694	0.009288563	0.00279
102	0.000890209	0.007182	0.090801267	0.732607572	0.00925958	0.002782
103	0.000825831	0.00731	0.085060549	0.75295786	0.009237208	0.002775
104	0.000766042	0.007433	0.079668396	0.773041029	0.009220519	0.00277
105	0.000710528	0.007551	0.074605433	0.792828631	0.009208647	0.002766
106	0.000658992	0.007663	0.069853145	0.812293357	0.009200793	0.002764
107	0.000611158	0.00777	0.065393876	0.831409086	0.009196213	0.002763
108	0.000566767	0.007872	0.061210803	0.85015093	0.009194223	0.002762
109	0.000525577	0.007968	0.05728792	0.868495262	0.009194193	0.002762
110	0.000487364	0.008058	0.053610018	0.886419754	0.009195544	0.002762
111	0.000451916	0.008143	0.05016266	0.903903393	0.009197744	0.002763
112	0.000419037	0.008223	0.046932154	0.9209265	0.009200311	0.002764
113	0.000388545	0.008296	0.04390553	0.937470742	0.009202805	0.002765
114	0.000360268	0.008364	0.041070511	0.953519133	0.009204827	0.002765
115	0.000334048	0.008427	0.038415487	0.96905604	0.009206019	0.002766

116	0.000309737	0.008483	0.035929488	0.984067176	0.009206057	0.002766
117	0.000287198	0.008535	0.033602153	0.998539587	0.009204655	0.002765
118	0.000266303	0.00858	0.031423708	1.012461648	0.009201556	0.002764
119	0.000246932	0.00862	0.029384934	1.025823035	0.009196537	0.002763
120	0.000228976	0.008655	0.027477145	1.038614711	0.0091894	0.002761
121	0.000212332	0.008685	0.025692159	1.050828902	0.009179977	0.002758
122	0.000196904	0.008709	0.024022276	1.062459066	0.009168123	0.002754
123	0.000182604	0.008728	0.02246025	1.073499867	0.009153716	0.00275
124	0.000169349	0.008742	0.020999266	1.083947142	0.009136657	0.002745
125	0.000157063	0.00875	0.019632921	1.093797863	0.009116864	0.002739
126	0.000145676	0.008754	0.018355197	1.103050108	0.009094277	0.002732
127	0.000135122	0.008754	0.017160443	1.111703017	0.009068851	0.002724
128	0.000125339	0.008748	0.016043356	1.119756757	0.009040557	0.002716
129	0.000116271	0.008738	0.014998955	1.127212479	0.00900938	0.002707
130	0.000107866	0.008724	0.014022571	1.134072279	0.00897532	0.002696
131	0.000100075	0.008705	0.013109824	1.140339153	0.008938387	0.002685
132	9.28531E-05	0.008682	0.012256607	1.14601696	0.008898604	0.002673
133	8.61584E-05	0.008655	0.011459071	1.151110374	0.008856002	0.00266
134	7.99523E-05	0.008624	0.010713611	1.155624845	0.008810621	0.002647
135	7.41989E-05	0.008589	0.010016848	1.159566554	0.008762513	0.002632
136	6.88648E-05	0.008551	0.009365619	1.162942371	0.008711731	0.002617
137	6.39194E-05	0.008509	0.008756959	1.165759812	0.008658341	0.002601
138	5.9334E-05	0.008464	0.008188098	1.168027001	0.00860241	0.002584
139	5.50823E-05	0.008415	0.007656437	1.169752621	0.008544012	0.002567
140	5.11396E-05	0.008364	0.00715955	1.170945882	0.008483225	0.002548
141	4.74834E-05	0.008309	0.006695162	1.171616473	0.008420131	0.002529
142	4.40926E-05	0.008252	0.006261149	1.171774529	0.008354816	0.00251
143	4.09477E-05	0.008192	0.005855521	1.17143059	0.008287367	0.00249
144	3.80307E-05	0.008129	0.005476419	1.170595563	0.008217874	0.002469
145	3.53249E-05	0.008064	0.005122105	1.169280687	0.008146429	0.002447
146	3.28147E-05	0.007997	0.004790951	1.167497499	0.008073126	0.002425
147	3.0486E-05	0.007927	0.00448144	1.165257795	0.007998058	0.002403
148	2.83253E-05	0.007855	0.00419215	1.162573604	0.007921319	0.00238
149	2.63205E-05	0.007782	0.003921752	1.159457149	0.007843006	0.002356
150	2.44601E-05	0.007706	0.003669008	1.155920822	0.007763212	0.002332
151	2.27335E-05	0.007629	0.003432755	1.151977152	0.007682033	0.002308
152	2.1131E-05	0.00755	0.003211912	1.147638777	0.007599561	0.002283
153	1.96436E-05	0.00747	0.003005466	1.142918416	0.00751589	0.002258
154	1.82628E-05	0.007388	0.00281247	1.137828848	0.007431112	0.002232
155	1.69809E-05	0.007306	0.002632041	1.13238288	0.007345318	0.002207
156	1.57907E-05	0.007222	0.002463354	1.126593329	0.007258597	0.002181
157	1.46856E-05	0.007137	0.002305636	1.120473001	0.007171037	0.002154
158	1.36593E-05	0.007051	0.002158168	1.114034663	0.007082724	0.002128
159	1.27061E-05	0.006964	0.002020277	1.107291033	0.006993742	0.002101

160	1.18208E-05	0.006877	0.001891334	1.100254751	0.006904174	0.002074
161	1.09985E-05	0.006788	0.001770751	1.092938373	0.0068141	0.002047
162	1.02345E-05	0.0067	0.001657981	1.085354343	0.006723599	0.00202
163	9.52461E-06	0.006611	0.001552512	1.077514986	0.006632745	0.001993
164	8.86502E-06	0.006521	0.001453864	1.069432492	0.006541615	0.001965
165	8.25207E-06	0.006431	0.001361591	1.0611189	0.006450278	0.001938
166	7.68238E-06	0.006341	0.001275276	1.052586087	0.006358806	0.00191
167	7.15286E-06	0.006251	0.001194528	1.043845762	0.006267263	0.001883
168	6.66062E-06	0.00616	0.001118984	1.034909446	0.006175717	0.001855
169	6.20298E-06	0.00607	0.001048304	1.025788471	0.006084228	0.001828
170	5.77747E-06	0.005979	0.00098217	1.016493968	0.005992857	0.0018
171	5.38178E-06	0.005889	0.000920285	1.007036859	0.005901662	0.001773
172	5.01379E-06	0.005799	0.000862372	0.997427851	0.005810698	0.001746
173	4.67151E-06	0.005709	0.000808172	0.987677431	0.005720018	0.001718
174	4.35313E-06	0.00562	0.000757444	0.977795858	0.005629674	0.001691
175	4.05692E-06	0.00553	0.000709962	0.967793159	0.005539713	0.001664
176	3.78133E-06	0.005441	0.000665514	0.957679129	0.005450182	0.001637
177	3.52488E-06	0.005353	0.000623903	0.947463322	0.005361125	0.001611
178	3.28622E-06	0.005265	0.000584946	0.93715505	0.005272584	0.001584
179	3.06408E-06	0.005177	0.000548471	0.926763384	0.005184599	0.001558
180	2.85731E-06	0.005091	0.000514315	0.916297148	0.005097207	0.001531
181	2.66481E-06	0.005004	0.000482331	0.905764921	0.005010444	0.001505
182	2.48558E-06	0.004919	0.000452376	0.895175034	0.004924344	0.001479
183	2.31869E-06	0.004834	0.00042432	0.884535574	0.004838938	0.001454
184	2.16326E-06	0.004749	0.00039804	0.873854377	0.004754256	0.001428
185	2.0185E-06	0.004666	0.000373422	0.863139037	0.004670326	0.001403
186	1.88365E-06	0.004583	0.00035036	0.852396901	0.004587174	0.001378
187	1.75803E-06	0.004501	0.000328751	0.841635075	0.004504824	0.001353
188	1.64098E-06	0.004419	0.000308504	0.830860419	0.004423299	0.001329
189	1.53191E-06	0.004339	0.000289532	0.820079559	0.00434262	0.001305
190	1.43027E-06	0.004259	0.000271751	0.809298879	0.004262805	0.001281
191	1.33553E-06	0.004181	0.000255086	0.798524531	0.004183873	0.001257
192	1.24722E-06	0.004103	0.000239465	0.787762436	0.00410584	0.001233
193	1.16488E-06	0.004026	0.000224823	0.777018283	0.00402872	0.00121
194	1.08812E-06	0.00395	0.000211095	0.766297539	0.003952526	0.001187
195	1.01654E-06	0.003875	0.000198225	0.755605448	0.003877272	0.001165
196	9.49779E-07	0.003801	0.000186157	0.744947036	0.003802966	0.001142
197	8.87512E-07	0.003728	0.00017484	0.734327112	0.00372962	0.00112
198	8.29428E-07	0.003655	0.000164227	0.723750279	0.00365724	0.001099
199	7.75239E-07	0.003584	0.000154273	0.713220929	0.003585834	0.001077
200	7.24678E-07	0.003514	0.000144936	0.702743254	0.003515407	0.001056
201	6.77496E-07	0.003444	0.000136177	0.692321247	0.003445965	0.001035
202	6.33462E-07	0.003376	0.000127959	0.681958707	0.003377511	0.001015
203	5.92362E-07	0.003309	0.000120249	0.671659244	0.003310048	0.000994

204	5.53995E-07	0.003242	0.000113015	0.661426282	0.003243578	0.000974
205	5.18175E-07	0.003177	0.000106226	0.651263065	0.003178102	0.000955
206	4.84729E-07	0.003112	9.98542E-05	0.64117266	0.00311362	0.000935
207	4.53496E-07	0.003049	9.38738E-05	0.631157963	0.00305013	0.000916
208	4.24327E-07	0.002987	8.826E-05	0.621221701	0.002987633	0.000898
209	3.97081E-07	0.002925	8.299E-05	0.61136644	0.002926125	0.000879
210	3.71629E-07	0.002865	7.80421E-05	0.601594586	0.002865603	0.000861
211	3.4785E-07	0.002805	7.33963E-05	0.591908394	0.002806065	0.000843
212	3.25631E-07	0.002747	6.90337E-05	0.582309967	0.002747505	0.000825
213	3.04867E-07	0.002689	6.49367E-05	0.572801264	0.002689919	0.000808
214	2.85461E-07	0.002633	6.10887E-05	0.563384103	0.002633302	0.000791
215	2.67322E-07	0.002577	5.74742E-05	0.554060166	0.002577648	0.000774
216	2.50365E-07	0.002522	5.40789E-05	0.544831005	0.00252295	0.000758
217	2.34512E-07	0.002469	5.0889E-05	0.535698041	0.002469202	0.000742
218	2.19688E-07	0.002416	4.78919E-05	0.526662575	0.002416396	0.000726
219	2.05825E-07	0.002364	4.50756E-05	0.517725786	0.002364525	0.00071
220	1.92859E-07	0.002313	4.2429E-05	0.508888742	0.002313581	0.000695
221	1.80732E-07	0.002263	3.99417E-05	0.500152395	0.002263555	0.00068
222	1.69386E-07	0.002214	3.76038E-05	0.491517593	0.002214438	0.000665
223	1.58772E-07	0.002166	3.54061E-05	0.482985081	0.002166223	0.000651
224	1.4884E-07	0.002119	3.33401E-05	0.474555504	0.002118899	0.000637
225	1.39545E-07	0.002072	3.13976E-05	0.466229412	0.002072456	0.000623
226	1.30846E-07	0.002027	2.95711E-05	0.458007262	0.002026886	0.000609
227	1.22703E-07	0.001982	2.78536E-05	0.449889424	0.001982178	0.000595
228	1.1508E-07	0.001938	2.62383E-05	0.441876184	0.001938322	0.000582
229	1.07943E-07	0.001895	2.4719E-05	0.433967745	0.001895308	0.000569
230	1.01261E-07	0.001853	2.32899E-05	0.426164235	0.001853124	0.000557
231	9.50025E-08	0.001812	2.19456E-05	0.418465704	0.001811762	0.000544
232	8.91413E-08	0.001771	2.06808E-05	0.410872134	0.001771209	0.000532
233	8.36512E-08	0.001731	1.94907E-05	0.403383438	0.001731455	0.00052
234	7.85081E-08	0.001692	1.83709E-05	0.395999463	0.001692489	0.000508
235	7.36895E-08	0.001654	1.7317E-05	0.388719995	0.0016543	0.000497
236	6.91745E-08	0.001617	1.63252E-05	0.381544762	0.001616876	0.000486
237	6.49434E-08	0.00158	1.53916E-05	0.374473433	0.001580208	0.000475
238	6.0978E-08	0.001544	1.45128E-05	0.367505627	0.001544284	0.000464
239	5.72611E-08	0.001509	1.36854E-05	0.360640909	0.001509091	0.000453
240	5.37767E-08	0.001474	1.29064E-05	0.353878798	0.00147462	0.000443
241	5.051E-08	0.001441	1.21729E-05	0.347218767	0.00144086	0.000433
242	4.7447E-08	0.001408	1.14822E-05	0.340660246	0.001407798	0.000423
243	4.45746E-08	0.001375	1.08316E-05	0.334202622	0.001375423	0.000413
244	4.18808E-08	0.001344	1.02189E-05	0.327845248	0.001343726	0.000404
245	3.93541E-08	0.001313	9.64175E-06	0.321587435	0.001312694	0.000394
246	3.69839E-08	0.001282	9.09803E-06	0.315428466	0.001282316	0.000385
247	3.47602E-08	0.001253	8.58577E-06	0.309367587	0.001252581	0.000376

248	3.26738E-08	0.001223	8.1031E-06	0.303404016	0.00122348	0.000368
249	3.0716E-08	0.001195	7.64827E-06	0.297536944	0.001194999	0.000359
250	2.88786E-08	0.001167	7.21964E-06	0.291765535	0.00116713	0.000351
251	2.7154E-08	0.00114	6.81566E-06	0.286088927	0.00113986	0.000342
252	2.55352E-08	0.001113	6.43488E-06	0.280506237	0.00111318	0.000334
253	2.40155E-08	0.001087	6.07592E-06	0.275016562	0.001087078	0.000327
254	2.25887E-08	0.001061	5.73752E-06	0.269618978	0.001061545	0.000319
255	2.12488E-08	0.001037	5.41846E-06	0.264312544	0.001036569	0.000311
256	1.99906E-08	0.001012	5.1176E-06	0.259096303	0.001012142	0.000304
257	1.88089E-08	0.000988	4.83389E-06	0.253969283	0.000988251	0.000297
258	1.76989E-08	0.000965	4.56633E-06	0.248930498	0.000964888	0.00029
259	1.66562E-08	0.000942	4.31396E-06	0.243978951	0.000942043	0.000283
260	1.56766E-08	0.00092	4.07591E-06	0.239113633	0.000919704	0.000276
261	1.47561E-08	0.000898	3.85135E-06	0.234333528	0.000897864	0.00027
262	1.38912E-08	0.000876	3.63948E-06	0.229637609	0.000876512	0.000263
263	1.30783E-08	0.000856	3.43958E-06	0.225024842	0.000855638	0.000257
264	1.23142E-08	0.000835	3.25095E-06	0.220494189	0.000835234	0.000251
265	1.1596E-08	0.000815	3.07294E-06	0.216044605	0.00081529	0.000245
266	1.09208E-08	0.000796	2.90493E-06	0.211675041	0.000795796	0.000239
267	1.0286E-08	0.000777	2.74636E-06	0.207384445	0.000776745	0.000233
268	9.68905E-09	0.000758	2.59667E-06	0.203171765	0.000758126	0.000228
269	9.12771E-09	0.00074	2.45535E-06	0.199035943	0.000739932	0.000222
270	8.59976E-09	0.000722	2.32194E-06	0.194975925	0.000722153	0.000217
271	8.10318E-09	0.000705	2.19596E-06	0.190990655	0.000704781	0.000212
272	7.63604E-09	0.000688	2.077E-06	0.187079078	0.000687809	0.000207
273	7.19657E-09	0.000671	1.96466E-06	0.18324014	0.000671226	0.000202
274	6.78307E-09	0.000655	1.85856E-06	0.179472791	0.000655026	0.000197
275	6.39397E-09	0.000639	1.75834E-06	0.175775983	0.0006392	0.000192
276	6.0278E-09	0.000624	1.66367E-06	0.172148671	0.000623741	0.000187
277	5.68316E-09	0.000609	1.57424E-06	0.168589817	0.000608641	0.000183
278	5.35876E-09	0.000594	1.48974E-06	0.165098383	0.000593892	0.000178
279	5.05338E-09	0.000579	1.40989E-06	0.16167334	0.000579486	0.000174
280	4.76588E-09	0.000565	1.33445E-06	0.158313663	0.000565417	0.00017
281	4.49518E-09	0.000552	1.26314E-06	0.155018334	0.000551677	0.000166
282	4.24027E-09	0.000538	1.19575E-06	0.151786341	0.000538259	0.000162
283	4.0002E-09	0.000525	1.13206E-06	0.148616677	0.000525157	0.000158
284	3.7741E-09	0.000512	1.07184E-06	0.145508347	0.000512362	0.000154
285	3.56112E-09	0.0005	1.01492E-06	0.142460359	0.000499869	0.00015
286	3.36049E-09	0.000488	9.61101E-07	0.139471732	0.000487671	0.000147
287	3.17147E-09	0.000476	9.10213E-07	0.136541491	0.000475762	0.000143
288	2.99337E-09	0.000464	8.62091E-07	0.133668672	0.000464134	0.000139
289	2.82555E-09	0.000453	8.16583E-07	0.130852318	0.000452783	0.000136
290	2.66739E-09	0.000442	7.73542E-07	0.128091482	0.000441701	0.000133
291	2.51832E-09	0.000431	7.32831E-07	0.125385225	0.000430883	0.000129

292	2.37781E-09	0.00042	6.9432E-07	0.122732619	0.000420323	0.000126
293	2.24535E-09	0.00041	6.57888E-07	0.120132746	0.000410015	0.000123
294	2.12047E-09	0.0004	6.23419E-07	0.117584695	0.000399953	0.00012
295	2.00273E-09	0.00039	5.90805E-07	0.11508757	0.000390132	0.000117
296	1.8917E-09	0.000381	5.59944E-07	0.112640479	0.000380547	0.000114
297	1.787E-09	0.000371	5.30738E-07	0.110242546	0.000371191	0.000112
298	1.68825E-09	0.000362	5.03097E-07	0.107892901	0.000362061	0.000109
299	1.5951E-09	0.000353	4.76935E-07	0.105590688	0.00035315	0.000106
300	1.50723E-09	0.000344	4.5217E-07	0.103335059	0.000344454	0.000103
301	1.42434E-09	0.000336	4.28726E-07	0.101125178	0.000335967	0.000101
302	1.34613E-09	0.000328	4.06531E-07	0.098960218	0.000327686	9.84E-05
303	1.27233E-09	0.00032	3.85516E-07	0.096839366	0.000319605	9.6E-05
304	1.20269E-09	0.000312	3.65616E-07	0.094761817	0.000311719	9.36E-05
305	1.13696E-09	0.000304	3.46772E-07	0.092726777	0.000304025	9.13E-05
306	1.07492E-09	0.000297	3.28926E-07	0.090733464	0.000296517	8.91E-05
307	1.01636E-09	0.000289	3.12023E-07	0.088781107	0.000289192	8.69E-05
308	9.61078E-10	0.000282	2.96012E-07	0.086868945	0.000282044	8.47E-05
309	9.08884E-10	0.000275	2.80845E-07	0.084996227	0.000275071	8.26E-05
310	8.59602E-10	0.000268	2.66477E-07	0.083162215	0.000268267	8.06E-05
311	8.13065E-10	0.000262	2.52863E-07	0.08136618	0.000261629	7.86E-05
312	7.69117E-10	0.000255	2.39964E-07	0.079607405	0.000255154	7.67E-05
313	7.27608E-10	0.000249	2.27741E-07	0.077885183	0.000248836	7.48E-05
314	6.88401E-10	0.000243	2.16158E-07	0.076198818	0.000242673	7.29E-05
315	6.51365E-10	0.000237	2.0518E-07	0.074547624	0.000236661	7.11E-05
316	6.16375E-10	0.000231	1.94775E-07	0.072930927	0.000230796	6.93E-05
317	5.83316E-10	0.000225	1.84911E-07	0.071348063	0.000225074	6.76E-05
318	5.52079E-10	0.000219	1.75561E-07	0.069798377	0.000219493	6.59E-05
319	5.2256E-10	0.000214	1.66697E-07	0.068281226	0.000214049	6.43E-05
320	4.94663E-10	0.000209	1.58292E-07	0.066795977	0.000208739	6.27E-05
321	4.68295E-10	0.000204	1.50323E-07	0.065342008	0.000203559	6.12E-05
322	4.43372E-10	0.000199	1.42766E-07	0.063918705	0.000198506	5.96E-05
323	4.19811E-10	0.000194	1.35599E-07	0.062525467	0.000193578	5.82E-05
324	3.97536E-10	0.000189	1.28802E-07	0.0611617	0.000188772	5.67E-05
325	3.76475E-10	0.000184	1.22355E-07	0.059826822	0.000184083	5.53E-05
326	3.56561E-10	0.00018	1.16239E-07	0.05852026	0.000179511	5.39E-05
327	3.37729E-10	0.000175	1.10437E-07	0.057241451	0.000175051	5.26E-05
328	3.19919E-10	0.000171	1.04933E-07	0.055989842	0.000170701	5.13E-05
329	3.03073E-10	0.000166	9.97111E-08	0.054764889	0.000166459	5E-05
330	2.87139E-10	0.000162	9.47559E-08	0.053566058	0.000162322	4.88E-05
331	2.72065E-10	0.000158	9.00536E-08	0.052392822	0.000158287	4.76E-05
332	2.57805E-10	0.000154	8.55912E-08	0.051244667	0.000154352	4.64E-05
333	2.44312E-10	0.000151	8.13559E-08	0.050121085	0.000150514	4.52E-05
334	2.31545E-10	0.000147	7.73359E-08	0.04902158	0.000146772	4.41E-05
335	2.19463E-10	0.000143	7.352E-08	0.047945661	0.000143122	4.3E-05

336	2.08028E-10	0.00014	6.98976E-08	0.046892848	0.000139563	4.19E-05
337	1.97206E-10	0.000136	6.64585E-08	0.045862671	0.000136091	4.09E-05
338	1.86962E-10	0.000133	6.31933E-08	0.044854667	0.000132707	3.99E-05
339	1.77265E-10	0.000129	6.00929E-08	0.04386838	0.000129406	3.89E-05
340	1.68085E-10	0.000126	5.71488E-08	0.042903366	0.000126187	3.79E-05
341	1.59393E-10	0.000123	5.43529E-08	0.041959185	0.000123048	3.7E-05
342	1.51162E-10	0.00012	5.16975E-08	0.041035409	0.000119987	3.6E-05
343	1.43368E-10	0.000117	4.91754E-08	0.040131616	0.000117002	3.51E-05
344	1.35988E-10	0.000114	4.67797E-08	0.039247391	0.000114092	3.43E-05
345	1.28997E-10	0.000111	4.4504E-08	0.038382329	0.000111253	3.34E-05
346	1.22376E-10	0.000108	4.2342E-08	0.037536031	0.000108486	3.26E-05
347	1.16103E-10	0.000106	4.02879E-08	0.036708107	0.000105787	3.18E-05
348	1.10161E-10	0.000103	3.83362E-08	0.035898173	0.000103156	3.1E-05
349	1.04532E-10	0.000101	3.64816E-08	0.035105854	0.00010059	3.02E-05
350	9.91977E-11	9.81E-05	3.47192E-08	0.034330779	9.80882E-05	2.95E-05
351	9.41433E-11	9.56E-05	3.30443E-08	0.033572587	9.56486E-05	2.87E-05
352	8.93534E-11	9.33E-05	3.14524E-08	0.032830924	9.32699E-05	2.8E-05
353	8.48139E-11	9.1E-05	2.99393E-08	0.032105442	9.09505E-05	2.73E-05
354	8.05113E-11	8.87E-05	2.8501E-08	0.031395799	8.86889E-05	2.66E-05
355	7.6433E-11	8.65E-05	2.71337E-08	0.030701661	8.64837E-05	2.6E-05
356	7.25668E-11	8.43E-05	2.58338E-08	0.0300227	8.43336E-05	2.53E-05
357	6.89016E-11	8.22E-05	2.45979E-08	0.029358595	8.22371E-05	2.47E-05
358	6.54265E-11	8.02E-05	2.34227E-08	0.02870903	8.0193E-05	2.41E-05
359	6.21315E-11	7.82E-05	2.23052E-08	0.028073697	7.81999E-05	2.35E-05
360	5.90069E-11	7.63E-05	2.12425E-08	0.027452293	7.62565E-05	2.29E-05
361	5.60438E-11	7.44E-05	2.02318E-08	0.026844521	7.43617E-05	2.23E-05
362	5.32335E-11	7.25E-05	1.92705E-08	0.02625009	7.25142E-05	2.18E-05
363	5.0568E-11	7.07E-05	1.83562E-08	0.025668715	7.07128E-05	2.12E-05
364	4.80396E-11	6.9E-05	1.74864E-08	0.025100117	6.89565E-05	2.07E-05
365	4.56411E-11	6.72E-05	1.6659E-08	0.024544023	6.7244E-05	2.02E-05
366	4.33656E-11	6.56E-05	1.58718E-08	0.024000164	6.55743E-05	1.97E-05
367	4.12066E-11	6.39E-05	1.51228E-08	0.023468277	6.39464E-05	1.92E-05
368	3.9158E-11	6.24E-05	1.44102E-08	0.022948106	6.23591E-05	1.87E-05
369	3.72141E-11	6.08E-05	1.3732E-08	0.022439397	6.08115E-05	1.83E-05
370	3.53693E-11	5.93E-05	1.30866E-08	0.021941905	5.93025E-05	1.78E-05
371	3.36184E-11	5.78E-05	1.24724E-08	0.021455386	5.78313E-05	1.74E-05
372	3.19566E-11	5.64E-05	1.18878E-08	0.020979605	5.63969E-05	1.69E-05
373	3.03791E-11	5.5E-05	1.13314E-08	0.020514328	5.49983E-05	1.65E-05
374	2.88817E-11	5.36E-05	1.08017E-08	0.020059329	5.36346E-05	1.61E-05
375	2.746E-11	5.23E-05	1.02975E-08	0.019614386	5.23051E-05	1.57E-05
376	2.61103E-11	5.1E-05	9.81747E-09	0.019179279	5.10088E-05	1.53E-05
377	2.48287E-11	4.97E-05	9.36042E-09	0.018753795	4.97449E-05	1.49E-05
378	2.36117E-11	4.85E-05	8.92522E-09	0.018337726	4.85126E-05	1.46E-05
379	2.2456E-11	4.73E-05	8.51082E-09	0.017930867	4.7311E-05	1.42E-05

380	2.13584E-11	4.61E-05	8.11619E-09	0.017533016	4.61396E-05	1.39E-05
381	2.03159E-11	4.5E-05	7.74036E-09	0.017143978	4.49974E-05	1.35E-05
382	1.93257E-11	4.39E-05	7.38241E-09	0.016763561	4.38837E-05	1.32E-05
383	1.8385E-11	4.28E-05	7.04147E-09	0.016391577	4.27979E-05	1.29E-05
384	1.74914E-11	4.17E-05	6.71671E-09	0.01602784	4.17392E-05	1.25E-05
385	1.66424E-11	4.07E-05	6.40733E-09	0.015672172	4.0707E-05	1.22E-05
386	1.58358E-11	3.97E-05	6.1126E-09	0.015324395	3.97005E-05	1.19E-05
387	1.50693E-11	3.87E-05	5.8318E-09	0.014984336	3.87193E-05	1.16E-05
388	1.43409E-11	3.78E-05	5.56425E-09	0.014651827	3.77625E-05	1.13E-05
389	1.36486E-11	3.68E-05	5.30931E-09	0.014326702	3.68296E-05	1.11E-05
390	1.29907E-11	3.59E-05	5.06638E-09	0.014008799	3.592E-05	1.08E-05
391	1.23654E-11	3.5E-05	4.83486E-09	0.013697959	3.50332E-05	1.05E-05
392	1.1771E-11	3.42E-05	4.61422E-09	0.013394027	3.41685E-05	1.03E-05
393	1.12059E-11	3.33E-05	4.40392E-09	0.013096851	3.33253E-05	1E-05
394	1.06687E-11	3.25E-05	4.20347E-09	0.012806282	3.25033E-05	9.76E-06
395	1.0158E-11	3.17E-05	4.01239E-09	0.012522175	3.17017E-05	9.52E-06
396	9.67233E-12	3.09E-05	3.83024E-09	0.012244387	3.09202E-05	9.29E-06
397	9.21054E-12	3.02E-05	3.65659E-09	0.01197278	3.01582E-05	9.06E-06
398	8.7714E-12	2.94E-05	3.49102E-09	0.011707217	2.94151E-05	8.84E-06
399	8.35377E-12	2.87E-05	3.33315E-09	0.011447563	2.86907E-05	8.62E-06
400	7.95656E-12	2.8E-05	3.18262E-09	0.01119369	2.79842E-05	8.41E-06
401	7.57875E-12	2.73E-05	3.03908E-09	0.010945468	2.72955E-05	8.2E-06
402	7.21937E-12	2.66E-05	2.90219E-09	0.010702774	2.66238E-05	8E-06
403	6.87749E-12	2.6E-05	2.77163E-09	0.010465485	2.5969E-05	7.8E-06
404	6.55224E-12	2.53E-05	2.64711E-09	0.01023348	2.53304E-05	7.61E-06
405	6.24279E-12	2.47E-05	2.52833E-09	0.010006644	2.47078E-05	7.42E-06
406	5.94835E-12	2.41E-05	2.41503E-09	0.009784861	2.41007E-05	7.24E-06
407	5.66817E-12	2.35E-05	2.30695E-09	0.00956802	2.35087E-05	7.06E-06
408	5.40155E-12	2.29E-05	2.20383E-09	0.00935601	2.29314E-05	6.89E-06
409	5.14781E-12	2.24E-05	2.10546E-09	0.009148726	2.23685E-05	6.72E-06
410	4.90632E-12	2.18E-05	2.01159E-09	0.008946061	2.18197E-05	6.55E-06
411	4.67646E-12	2.13E-05	1.92202E-09	0.008747913	2.12845E-05	6.39E-06
412	4.45766E-12	2.08E-05	1.83655E-09	0.008554183	2.07626E-05	6.24E-06
413	4.24937E-12	2.03E-05	1.75499E-09	0.008364771	2.02537E-05	6.08E-06
414	4.05108E-12	1.98E-05	1.67715E-09	0.008179581	1.97575E-05	5.94E-06
415	3.86229E-12	1.93E-05	1.60285E-09	0.007998521	1.92736E-05	5.79E-06
416	3.68254E-12	1.88E-05	1.53194E-09	0.007821497	1.88017E-05	5.65E-06
417	3.51138E-12	1.83E-05	1.46425E-09	0.00764842	1.83415E-05	5.51E-06
418	3.3484E-12	1.79E-05	1.39963E-09	0.007479203	1.78928E-05	5.38E-06
419	3.19318E-12	1.75E-05	1.33794E-09	0.007313759	1.74553E-05	5.24E-06
420	3.04535E-12	1.7E-05	1.27905E-09	0.007152003	1.70286E-05	5.12E-06
421	2.90455E-12	1.66E-05	1.22282E-09	0.006993855	1.66125E-05	4.99E-06
422	2.77044E-12	1.62E-05	1.16912E-09	0.006839233	1.62067E-05	4.87E-06
423	2.64268E-12	1.58E-05	1.11786E-09	0.006688059	1.5811E-05	4.75E-06

424	2.52098E-12	1.54E-05	1.0689E-09	0.006540256	1.54251E-05	4.63E-06
425	2.40503E-12	1.5E-05	1.02214E-09	0.006395748	1.50488E-05	4.52E-06
426	2.29456E-12	1.47E-05	9.77485E-10	0.006254463	1.46818E-05	4.41E-06
427	2.18931E-12	1.43E-05	9.34834E-10	0.006116328	1.4324E-05	4.3E-06
428	2.08901E-12	1.4E-05	8.94095E-10	0.005981273	1.39749E-05	4.2E-06
429	1.99343E-12	1.36E-05	8.5518E-10	0.005849229	1.36346E-05	4.1E-06
430	1.90234E-12	1.33E-05	8.18005E-10	0.005720128	1.33026E-05	4E-06
431	1.81552E-12	1.3E-05	7.8249E-10	0.005593906	1.29789E-05	3.9E-06
432	1.73278E-12	1.27E-05	7.4856E-10	0.005470497	1.26632E-05	3.8E-06
433	1.6539E-12	1.24E-05	7.16141E-10	0.005349839	1.23553E-05	3.71E-06
434	1.57872E-12	1.21E-05	6.85164E-10	0.005231871	1.2055E-05	3.62E-06
435	1.50704E-12	1.18E-05	6.55564E-10	0.005116531	1.17621E-05	3.53E-06
436	1.43871E-12	1.15E-05	6.27278E-10	0.005003762	1.14765E-05	3.45E-06
437	1.37356E-12	1.12E-05	6.00245E-10	0.004893506	1.1198E-05	3.36E-06
438	1.31144E-12	1.09E-05	5.7441E-10	0.004785706	1.09263E-05	3.28E-06
439	1.2522E-12	1.07E-05	5.49716E-10	0.004680309	1.06613E-05	3.2E-06
440	1.19571E-12	1.04E-05	5.26114E-10	0.004577259	1.04029E-05	3.13E-06
441	1.14184E-12	1.02E-05	5.03552E-10	0.004476504	1.01508E-05	3.05E-06
442	1.09046E-12	9.9E-06	4.81984E-10	0.004377994	9.90497E-06	2.98E-06
443	1.04146E-12	9.67E-06	4.61366E-10	0.004281677	9.66519E-06	2.9E-06
444	9.94715E-13	9.43E-06	4.41653E-10	0.004187505	9.43132E-06	2.83E-06
445	9.50126E-13	9.2E-06	4.22806E-10	0.004095429	9.20321E-06	2.76E-06
446	9.0759E-13	8.98E-06	4.04785E-10	0.004005404	8.98073E-06	2.7E-06
447	8.67009E-13	8.76E-06	3.87553E-10	0.003917382	8.76372E-06	2.63E-06
448	8.28292E-13	8.55E-06	3.71075E-10	0.003831319	8.55205E-06	2.57E-06
449	7.9135E-13	8.35E-06	3.55316E-10	0.00374717	8.34559E-06	2.51E-06
450	7.561E-13	8.14E-06	3.40245E-10	0.003664895	8.14421E-06	2.45E-06
451	7.22463E-13	7.95E-06	3.25831E-10	0.003584449	7.94778E-06	2.39E-06
452	6.90362E-13	7.76E-06	3.12044E-10	0.003505792	7.75618E-06	2.33E-06
453	6.59726E-13	7.57E-06	2.98856E-10	0.003428885	7.56928E-06	2.27E-06
454	6.30486E-13	7.39E-06	2.86241E-10	0.003353688	7.38698E-06	2.22E-06
455	6.02577E-13	7.21E-06	2.74172E-10	0.003280162	7.20915E-06	2.17E-06
456	5.75936E-13	7.04E-06	2.62627E-10	0.00320827	7.03568E-06	2.11E-06
457	5.50505E-13	6.87E-06	2.51581E-10	0.003137977	6.86647E-06	2.06E-06
458	5.26227E-13	6.7E-06	2.41012E-10	0.003069244	6.70141E-06	2.01E-06
459	5.03049E-13	6.54E-06	2.30899E-10	0.003002039	6.54039E-06	1.96E-06
460	4.80919E-13	6.38E-06	2.21223E-10	0.002936326	6.38332E-06	1.92E-06
461	4.59788E-13	6.23E-06	2.11962E-10	0.002872073	6.23009E-06	1.87E-06
462	4.39611E-13	6.08E-06	2.031E-10	0.002809245	6.08062E-06	1.83E-06
463	4.20343E-13	5.93E-06	1.94619E-10	0.002747813	5.9348E-06	1.78E-06
464	4.01942E-13	5.79E-06	1.86501E-10	0.002687744	5.79255E-06	1.74E-06
465	3.84369E-13	5.65E-06	1.78731E-10	0.002629007	5.65378E-06	1.7E-06
466	3.67584E-13	5.52E-06	1.71294E-10	0.002571573	5.5184E-06	1.66E-06
467	3.51552E-13	5.39E-06	1.64175E-10	0.002515413	5.38632E-06	1.62E-06

468	3.36238E-13	5.26E-06	1.57359E-10	0.002460498	5.25748E-06	1.58E-06
469	3.21609E-13	5.13E-06	1.50835E-10	0.002406801	5.13177E-06	1.54E-06
470	3.07633E-13	5.01E-06	1.44588E-10	0.002354294	5.00914E-06	1.5E-06
471	2.94281E-13	4.89E-06	1.38607E-10	0.002302949	4.88949E-06	1.47E-06
472	2.81524E-13	4.77E-06	1.3288E-10	0.002252743	4.77276E-06	1.43E-06
473	2.69335E-13	4.66E-06	1.27396E-10	0.002203648	4.65888E-06	1.4E-06
474	2.57688E-13	4.55E-06	1.22144E-10	0.00215564	4.54776E-06	1.37E-06
475	2.46558E-13	4.44E-06	1.17115E-10	0.002108695	4.43936E-06	1.33E-06
476	2.35922E-13	4.33E-06	1.12299E-10	0.002062789	4.33359E-06	1.3E-06
477	2.25756E-13	4.23E-06	1.07686E-10	0.002017898	4.23039E-06	1.27E-06
478	2.16041E-13	4.13E-06	1.03267E-10	0.001974	4.12971E-06	1.24E-06
479	2.06754E-13	4.03E-06	9.90353E-11	0.001931073	4.03147E-06	1.21E-06
480	1.97878E-13	3.94E-06	9.49814E-11	0.001889095	3.93562E-06	1.18E-06
481	1.89393E-13	3.84E-06	9.10979E-11	0.001848045	3.84209E-06	1.15E-06
482	1.81281E-13	3.75E-06	8.73775E-11	0.001807901	3.75083E-06	1.13E-06
483	1.73526E-13	3.66E-06	8.38132E-11	0.001768645	3.66179E-06	1.1E-06
484	1.66112E-13	3.57E-06	8.03982E-11	0.001730255	3.57491E-06	1.07E-06
485	1.59023E-13	3.49E-06	7.71261E-11	0.001692713	3.49013E-06	1.05E-06
486	1.52245E-13	3.41E-06	7.39909E-11	0.001655999	3.40741E-06	1.02E-06
487	1.45763E-13	3.33E-06	7.09865E-11	0.001620095	3.32668E-06	9.99E-07
488	1.39564E-13	3.25E-06	6.81074E-11	0.001584984	3.24792E-06	9.76E-07
489	1.33637E-13	3.17E-06	6.53483E-11	0.001550646	3.17106E-06	9.53E-07
490	1.27967E-13	3.1E-06	6.27039E-11	0.001517066	3.09605E-06	9.3E-07
491	1.22545E-13	3.02E-06	6.01695E-11	0.001484225	3.02286E-06	9.08E-07
492	1.17358E-13	2.95E-06	5.77403E-11	0.001452108	2.95144E-06	8.87E-07
493	1.12397E-13	2.88E-06	5.54118E-11	0.001420699	2.88174E-06	8.66E-07
494	1.07651E-13	2.81E-06	5.31798E-11	0.001389981	2.81373E-06	8.45E-07
495	1.03111E-13	2.75E-06	5.10401E-11	0.001359939	2.74735E-06	8.25E-07
496	9.87679E-14	2.68E-06	4.89889E-11	0.001330558	2.68258E-06	8.06E-07
497	9.46122E-14	2.62E-06	4.70223E-11	0.001301823	2.61936E-06	7.87E-07
498	9.06361E-14	2.56E-06	4.51368E-11	0.001273721	2.55767E-06	7.68E-07
499	8.68315E-14	2.5E-06	4.33289E-11	0.001246236	2.49747E-06	7.5E-07
500	8.31909E-14	2.44E-06	4.15954E-11	0.001219355	2.43871E-06	7.33E-07
501	7.97069E-14	2.38E-06	3.99332E-11	0.001193065	2.38137E-06	7.15E-07
502	7.63728E-14	2.33E-06	3.83391E-11	0.001167352	2.3254E-06	6.99E-07
503	7.31818E-14	2.27E-06	3.68105E-11	0.001142203	2.27078E-06	6.82E-07
504	7.01278E-14	2.22E-06	3.53444E-11	0.001117607	2.21747E-06	6.66E-07
505	6.72045E-14	2.17E-06	3.39383E-11	0.00109355	2.16545E-06	6.51E-07
506	6.44064E-14	2.11E-06	3.25896E-11	0.001070021	2.11467E-06	6.35E-07
507	6.17278E-14	2.07E-06	3.1296E-11	0.001047007	2.0651E-06	6.2E-07
508	5.91637E-14	2.02E-06	3.00551E-11	0.001024499	2.01673E-06	6.06E-07
509	5.67088E-14	1.97E-06	2.88648E-11	0.001002483	1.96951E-06	5.92E-07
510	5.43586E-14	1.92E-06	2.77229E-11	0.000980949	1.92343E-06	5.78E-07

	69.5%
	37.9%
	9.4%
	4.7%
0.059683	1

m/A	n/N
3.21E-28	5.38E-27
1.11E-19	1.85E-18
1.59E-15	2.66E-14
5.96E-13	9.99E-12
3.62E-11	6.06E-10
7.52E-10	1.26E-08
7.82E-09	1.31E-07
5.03E-08	8.44E-07
2.29E-07	3.84E-06
8.02E-07	1.34E-05
2.29E-06	3.84E-05
5.59E-06	9.36E-05
1.2E-05	0.0002
2.31E-05	0.000386
4.07E-05	0.000681
6.66E-05	0.001117
0.000103	0.001718
0.00015	0.002506
0.000208	0.003488
0.000278	0.004664
0.000359	0.00602
0.00045	0.007533
0.000547	0.00917
0.00065	0.010894
0.000756	0.012664
0.000862	0.014438
0.000965	0.016174

0.001064	0.017836
0.001157	0.019389
0.001242	0.020806
0.001317	0.022066
0.001382	0.023153
0.001436	0.024056
0.001478	0.024771
0.00151	0.025299
0.00153	0.025643
0.001541	0.025813
0.001541	0.025818
0.001532	0.025671
0.001515	0.025386
0.001491	0.024978
0.00146	0.024462
0.001424	0.023854
0.001383	0.023168
0.001338	0.022418
0.00129	0.021619
0.00124	0.020781
0.001189	0.019917
0.001136	0.019036
0.001083	0.018149
0.00103	0.017262
0.000978	0.016384
0.000926	0.015519
0.000876	0.014673
0.000827	0.01385
0.000779	0.013054
0.000733	0.012286
0.000689	0.01155
0.000647	0.010846
0.000607	0.010175
0.000569	0.009539
0.000533	0.008936
0.000499	0.008367
0.000467	0.007831
0.000437	0.007328
0.000409	0.006857
0.000383	0.006416
0.000358	0.006005
0.000336	0.005622
0.000314	0.005266
0.000295	0.004935

0.000276	0.00463
0.000259	0.004347
0.000244	0.004086
0.00023	0.003845
0.000216	0.003624
0.000204	0.00342
0.000193	0.003234
0.000183	0.003063
0.000173	0.002906
0.000165	0.002763
0.000157	0.002632
0.00015	0.002513
0.000144	0.002405
0.000138	0.002306
0.000132	0.002216
0.000127	0.002135
0.000123	0.002061
0.000119	0.001994
0.000115	0.001933
0.000112	0.001878
0.000109	0.001828
0.000106	0.001782
0.000104	0.001741
0.000102	0.001704
9.97E-05	0.00167
9.79E-05	0.00164
9.62E-05	0.001611
9.47E-05	0.001586
9.33E-05	0.001562
9.2E-05	0.001541
9.08E-05	0.001521
8.97E-05	0.001503
8.87E-05	0.001485
8.77E-05	0.001469
8.68E-05	0.001454
8.59E-05	0.00144
8.51E-05	0.001426
8.44E-05	0.001413
8.36E-05	0.001401
8.29E-05	0.001388
8.21E-05	0.001376
8.14E-05	0.001365
8.07E-05	0.001353
8.01E-05	0.001341

7.94E-05	0.00133
7.87E-05	0.001318
7.8E-05	0.001307
7.73E-05	0.001295
7.66E-05	0.001283
7.59E-05	0.001271
7.51E-05	0.001259
7.44E-05	0.001247
7.37E-05	0.001235
7.29E-05	0.001222
7.22E-05	0.001209
7.14E-05	0.001196
7.06E-05	0.001183
6.98E-05	0.00117
6.9E-05	0.001157
6.82E-05	0.001143
6.74E-05	0.00113
6.66E-05	0.001116
6.58E-05	0.001102
6.49E-05	0.001088
6.41E-05	0.001073
6.32E-05	0.001059
6.23E-05	0.001044
6.15E-05	0.00103
6.06E-05	0.001015
5.97E-05	0.001001
5.88E-05	0.000986
5.8E-05	0.000971
5.71E-05	0.000956
5.62E-05	0.000941
5.53E-05	0.000926
5.44E-05	0.000912
5.35E-05	0.000897
5.26E-05	0.000882
5.18E-05	0.000867
5.09E-05	0.000852
5E-05	0.000838
4.91E-05	0.000823
4.83E-05	0.000809
4.74E-05	0.000794
4.65E-05	0.00078
4.57E-05	0.000765
4.48E-05	0.000751
4.4E-05	0.000737

4.32E-05	0.000723
4.23E-05	0.000709
4.15E-05	0.000695
4.07E-05	0.000682
3.99E-05	0.000668
3.91E-05	0.000655
3.83E-05	0.000642
3.75E-05	0.000629
3.68E-05	0.000616
3.6E-05	0.000603
3.53E-05	0.000591
3.45E-05	0.000578
3.38E-05	0.000566
3.31E-05	0.000554
3.24E-05	0.000542
3.17E-05	0.00053
3.1E-05	0.000519
3.03E-05	0.000507
2.96E-05	0.000496
2.9E-05	0.000485
2.83E-05	0.000474
2.77E-05	0.000464
2.71E-05	0.000453
2.64E-05	0.000443
2.58E-05	0.000433
2.52E-05	0.000423
2.47E-05	0.000413
2.41E-05	0.000404
2.35E-05	0.000394
2.3E-05	0.000385
2.24E-05	0.000376
2.19E-05	0.000367
2.14E-05	0.000358
2.09E-05	0.00035
2.04E-05	0.000341
1.99E-05	0.000333
1.94E-05	0.000325
1.89E-05	0.000317
1.85E-05	0.000309
1.8E-05	0.000302
1.76E-05	0.000295
1.71E-05	0.000287
1.67E-05	0.00028
1.63E-05	0.000273

1.59E-05	0.000266
1.55E-05	0.00026
1.51E-05	0.000253
1.47E-05	0.000247
1.44E-05	0.000241
1.4E-05	0.000235
1.36E-05	0.000229
1.33E-05	0.000223
1.3E-05	0.000217
1.26E-05	0.000212
1.23E-05	0.000206
1.2E-05	0.000201
1.17E-05	0.000196
1.14E-05	0.000191
1.11E-05	0.000186
1.08E-05	0.000181
1.05E-05	0.000176
1.02E-05	0.000172
9.97E-06	0.000167
9.71E-06	0.000163
9.46E-06	0.000158
9.21E-06	0.000154
8.97E-06	0.00015
8.73E-06	0.000146
8.5E-06	0.000142
8.28E-06	0.000139
8.06E-06	0.000135
7.84E-06	0.000131
7.63E-06	0.000128
7.43E-06	0.000125
7.23E-06	0.000121
7.04E-06	0.000118
6.85E-06	0.000115
6.67E-06	0.000112
6.49E-06	0.000109
6.31E-06	0.000106
6.14E-06	0.000103
5.98E-06	0.0001
5.82E-06	9.75E-05
5.66E-06	9.48E-05
5.51E-06	9.23E-05
5.36E-06	8.98E-05
5.21E-06	8.73E-05
5.07E-06	8.5E-05

4.93E-06	8.27E-05
4.8E-06	8.04E-05
4.67E-06	7.82E-05
4.54E-06	7.61E-05
4.42E-06	7.4E-05
4.3E-06	7.2E-05
4.18E-06	7E-05
4.06E-06	6.81E-05
3.95E-06	6.62E-05
3.85E-06	6.44E-05
3.74E-06	6.27E-05
3.64E-06	6.09E-05
3.54E-06	5.93E-05
3.44E-06	5.76E-05
3.35E-06	5.61E-05
3.25E-06	5.45E-05
3.16E-06	5.3E-05
3.08E-06	5.15E-05
2.99E-06	5.01E-05
2.91E-06	4.87E-05
2.83E-06	4.74E-05
2.75E-06	4.61E-05
2.67E-06	4.48E-05
2.6E-06	4.36E-05
2.53E-06	4.24E-05
2.46E-06	4.12E-05
2.39E-06	4.01E-05
2.32E-06	3.89E-05
2.26E-06	3.79E-05
2.2E-06	3.68E-05
2.14E-06	3.58E-05
2.08E-06	3.48E-05
2.02E-06	3.38E-05
1.96E-06	3.29E-05
1.91E-06	3.2E-05
1.86E-06	3.11E-05
1.8E-06	3.02E-05
1.75E-06	2.94E-05
1.71E-06	2.86E-05
1.66E-06	2.78E-05
1.61E-06	2.7E-05
1.57E-06	2.63E-05
1.52E-06	2.55E-05
1.48E-06	2.48E-05

1.44E-06	2.41E-05
1.4E-06	2.34E-05
1.36E-06	2.28E-05
1.32E-06	2.22E-05
1.29E-06	2.15E-05
1.25E-06	2.09E-05
1.21E-06	2.04E-05
1.18E-06	1.98E-05
1.15E-06	1.92E-05
1.12E-06	1.87E-05
1.09E-06	1.82E-05
1.05E-06	1.77E-05
1.03E-06	1.72E-05
9.97E-07	1.67E-05
9.69E-07	1.62E-05
9.42E-07	1.58E-05
9.16E-07	1.53E-05
8.9E-07	1.49E-05
8.65E-07	1.45E-05
8.41E-07	1.41E-05
8.18E-07	1.37E-05
7.95E-07	1.33E-05
7.73E-07	1.29E-05
7.51E-07	1.26E-05
7.3E-07	1.22E-05
7.1E-07	1.19E-05
6.9E-07	1.16E-05
6.71E-07	1.12E-05
6.52E-07	1.09E-05
6.34E-07	1.06E-05
6.16E-07	1.03E-05
5.99E-07	1E-05
5.83E-07	9.76E-06
5.66E-07	9.49E-06
5.51E-07	9.23E-06
5.35E-07	8.97E-06
5.2E-07	8.72E-06
5.06E-07	8.48E-06
4.92E-07	8.24E-06
4.78E-07	8.01E-06
4.65E-07	7.79E-06
4.52E-07	7.57E-06
4.39E-07	7.36E-06
4.27E-07	7.16E-06

4.15E-07	6.96E-06
4.04E-07	6.77E-06
3.93E-07	6.58E-06
3.82E-07	6.4E-06
3.71E-07	6.22E-06
3.61E-07	6.05E-06
3.51E-07	5.88E-06
3.41E-07	5.72E-06
3.32E-07	5.56E-06
3.22E-07	5.4E-06
3.14E-07	5.25E-06
3.05E-07	5.11E-06
2.96E-07	4.97E-06
2.88E-07	4.83E-06
2.8E-07	4.7E-06
2.73E-07	4.57E-06
2.65E-07	4.44E-06
2.58E-07	4.32E-06
2.51E-07	4.2E-06
2.44E-07	4.08E-06
2.37E-07	3.97E-06
2.3E-07	3.86E-06
2.24E-07	3.75E-06
2.18E-07	3.65E-06
2.12E-07	3.55E-06
2.06E-07	3.45E-06
2E-07	3.36E-06
1.95E-07	3.26E-06
1.89E-07	3.17E-06
1.84E-07	3.09E-06
1.79E-07	3E-06
1.74E-07	2.92E-06
1.69E-07	2.84E-06
1.65E-07	2.76E-06
1.6E-07	2.69E-06
1.56E-07	2.61E-06
1.52E-07	2.54E-06
1.47E-07	2.47E-06
1.43E-07	2.4E-06
1.39E-07	2.34E-06
1.36E-07	2.27E-06
1.32E-07	2.21E-06
1.28E-07	2.15E-06
1.25E-07	2.09E-06

1.21E-07	2.03E-06
1.18E-07	1.98E-06
1.15E-07	1.92E-06
1.12E-07	1.87E-06
1.09E-07	1.82E-06
1.06E-07	1.77E-06
1.03E-07	1.72E-06
1E-07	1.68E-06
9.73E-08	1.63E-06
9.47E-08	1.59E-06
9.21E-08	1.54E-06
8.96E-08	1.5E-06
8.72E-08	1.46E-06
8.48E-08	1.42E-06
8.25E-08	1.38E-06
8.03E-08	1.34E-06
7.81E-08	1.31E-06
7.6E-08	1.27E-06
7.39E-08	1.24E-06
7.19E-08	1.2E-06
7E-08	1.17E-06
6.81E-08	1.14E-06
6.62E-08	1.11E-06
6.44E-08	1.08E-06
6.27E-08	1.05E-06
6.1E-08	1.02E-06
5.94E-08	9.95E-07
5.78E-08	9.68E-07
5.62E-08	9.42E-07
5.47E-08	9.16E-07
5.32E-08	8.92E-07
5.18E-08	8.68E-07
5.04E-08	8.44E-07
4.9E-08	8.22E-07
4.77E-08	8E-07
4.64E-08	7.78E-07
4.52E-08	7.57E-07
4.4E-08	7.37E-07
4.28E-08	7.17E-07
4.17E-08	6.98E-07
4.05E-08	6.79E-07
3.95E-08	6.61E-07
3.84E-08	6.43E-07
3.74E-08	6.26E-07

3.64E-08	6.1E-07
3.54E-08	5.93E-07
3.45E-08	5.77E-07
3.35E-08	5.62E-07
3.27E-08	5.47E-07
3.18E-08	5.33E-07
3.09E-08	5.18E-07
3.01E-08	5.05E-07
2.93E-08	4.91E-07
2.85E-08	4.78E-07
2.78E-08	4.65E-07
2.7E-08	4.53E-07
2.63E-08	4.41E-07
2.56E-08	4.29E-07
2.49E-08	4.18E-07
2.43E-08	4.07E-07
2.36E-08	3.96E-07
2.3E-08	3.86E-07
2.24E-08	3.75E-07
2.18E-08	3.66E-07
2.12E-08	3.56E-07
2.07E-08	3.47E-07
2.01E-08	3.37E-07
1.96E-08	3.28E-07
1.91E-08	3.2E-07
1.86E-08	3.11E-07
1.81E-08	3.03E-07
1.76E-08	2.95E-07
1.72E-08	2.88E-07
1.67E-08	2.8E-07
1.63E-08	2.73E-07
1.58E-08	2.65E-07
1.54E-08	2.59E-07
1.5E-08	2.52E-07
1.46E-08	2.45E-07
1.42E-08	2.39E-07
1.39E-08	2.33E-07
1.35E-08	2.26E-07
1.32E-08	2.21E-07
1.28E-08	2.15E-07
1.25E-08	2.09E-07
1.22E-08	2.04E-07
1.18E-08	1.98E-07
1.15E-08	1.93E-07

1.12E-08	1.88E-07
1.09E-08	1.83E-07
1.07E-08	1.79E-07
1.04E-08	1.74E-07
1.01E-08	1.69E-07
9.85E-09	1.65E-07
9.59E-09	1.61E-07
9.35E-09	1.57E-07
9.1E-09	1.53E-07
8.87E-09	1.49E-07
8.64E-09	1.45E-07
8.42E-09	1.41E-07
8.2E-09	1.37E-07
7.99E-09	1.34E-07
7.78E-09	1.3E-07
7.58E-09	1.27E-07
7.39E-09	1.24E-07
7.2E-09	1.21E-07
7.01E-09	1.17E-07
6.83E-09	1.14E-07
6.66E-09	1.12E-07
6.48E-09	1.09E-07
6.32E-09	1.06E-07
6.16E-09	1.03E-07
6E-09	1.01E-07
5.85E-09	9.79E-08
5.7E-09	9.54E-08
5.55E-09	9.3E-08
5.41E-09	9.06E-08
5.27E-09	8.83E-08
5.14E-09	8.61E-08
5E-09	8.39E-08
4.88E-09	8.17E-08
4.75E-09	7.96E-08
4.63E-09	7.76E-08
4.51E-09	7.56E-08
4.4E-09	7.37E-08
4.29E-09	7.18E-08
4.18E-09	7E-08
4.07E-09	6.82E-08
3.97E-09	6.65E-08
3.87E-09	6.48E-08
3.77E-09	6.32E-08

Son Embodiment 2, Average, First Sigmas

1st/2nd 1
 Stdv 1 0.34
 mean 1 3.856
 stdv 2 0.34
 mean 2 4.9545

L/d 30-70 40.9%
 L/d 40-60 23.7%
 L/d 80-140 25.4%
 L/d 90-120 12.8%

SUM of dist 0.998657 0.998574 50.0 150.0 1.997231 1 0.029842
 Av Asp Rat

Aspect	Rati	m1	m2	(L/d)*m1	(L/d)*m2	m1 + m2	m/M	m/A
1	1.38E-28	9.09E-47	1.38E-28	9.09E-47	1.38E-28	6.89E-29	1.38E-28	
2	9.48E-20	4.54E-35	1.9E-19	9.08E-35	9.48E-20	4.74E-20	4.74E-20	
3	2.04E-15	4.61E-29	6.12E-15	1.38E-28	2.04E-15	1.02E-15	6.8E-16	
4	1.02E-12	3.55E-25	4.09E-12	1.42E-24	1.02E-12	5.12E-13	2.55E-13	
5	7.75E-11	2.25E-22	3.88E-10	1.12E-21	7.75E-11	3.88E-11	1.55E-11	
6	1.93E-09	3.17E-20	1.16E-08	1.9E-19	1.93E-09	9.68E-10	3.22E-10	
7	2.35E-08	1.66E-18	1.64E-07	1.16E-17	2.35E-08	1.17E-08	3.35E-09	
8	1.73E-07	4.35E-17	1.38E-06	3.48E-16	1.73E-07	8.64E-08	2.16E-08	
9	8.83E-07	6.82E-16	7.95E-06	6.14E-15	8.83E-07	4.42E-07	9.81E-08	
10	3.44E-06	7.22E-15	3.44E-05	7.22E-14	3.44E-06	1.72E-06	3.44E-07	
11	1.08E-05	5.62E-14	0.000119	6.18E-13	1.08E-05	5.41E-06	9.83E-07	
12	2.87E-05	3.41E-13	0.000345	4.1E-12	2.87E-05	1.44E-05	2.39E-06	
13	6.67E-05	1.69E-12	0.000867	2.2E-11	6.67E-05	3.34E-05	5.13E-06	
14	0.000138	7.11E-12	0.001936	9.95E-11	0.000138	6.93E-05	9.88E-06	
15	0.000261	2.59E-11	0.003922	3.88E-10	0.000261	0.000131	1.74E-05	
16	0.000457	8.36E-11	0.007311	1.34E-09	0.000457	0.000229	2.86E-05	
17	0.000747	2.43E-10	0.012701	4.13E-09	0.000747	0.000374	4.39E-05	
18	0.001154	6.46E-10	0.020765	1.16E-08	0.001154	0.000578	6.41E-05	
19	0.001695	1.59E-09	0.032209	3.02E-08	0.001695	0.000849	8.92E-05	
20	0.002386	3.64E-09	0.047719	7.27E-08	0.002386	0.001195	0.000119	
21	0.003234	7.84E-09	0.067905	1.65E-07	0.003234	0.001619	0.000154	
22	0.004239	1.6E-08	0.093253	3.52E-07	0.004239	0.002122	0.000193	
23	0.005395	3.1E-08	0.124079	7.14E-07	0.005395	0.002701	0.000235	
24	0.006688	5.76E-08	0.160508	1.38E-06	0.006688	0.003349	0.000279	
25	0.008098	1.03E-07	0.20246	2.57E-06	0.008098	0.004055	0.000324	
26	0.009602	1.77E-07	0.249648	4.6E-06	0.009602	0.004808	0.000369	
27	0.01117	2.95E-07	0.301597	7.96E-06	0.011171	0.005593	0.000414	

28	0.012774	4.76E-07	0.357665	1.33E-05	0.012774	0.006396	0.000456
29	0.014382	7.49E-07	0.417078	2.17E-05	0.014383	0.007201	0.000496
30	0.015965	1.15E-06	0.478962	3.44E-05	0.015967	0.007994	0.000532
31	0.017496	1.72E-06	0.542385	5.32E-05	0.017498	0.008761	0.000564
32	0.01895	2.51E-06	0.606387	8.04E-05	0.018952	0.009489	0.000592
33	0.020304	3.61E-06	0.67002	0.000119	0.020307	0.010168	0.000615
34	0.02154	5.08E-06	0.732373	0.000173	0.021545	0.010788	0.000634
35	0.022646	7.04E-06	0.792597	0.000246	0.022653	0.011342	0.000647
36	0.023609	9.59E-06	0.849926	0.000345	0.023619	0.011826	0.000656
37	0.024424	1.29E-05	0.903688	0.000476	0.024437	0.012235	0.00066
38	0.025087	1.7E-05	0.953317	0.000647	0.025104	0.01257	0.000661
39	0.025599	2.22E-05	0.998353	0.000868	0.025621	0.012828	0.000657
40	0.025961	2.87E-05	1.038446	0.001148	0.02599	0.013013	0.00065
41	0.026179	3.66E-05	1.073351	0.001501	0.026216	0.013126	0.000639
42	0.02626	4.62E-05	1.102923	0.001939	0.026306	0.013171	0.000626
43	0.026212	5.76E-05	1.127109	0.002478	0.026269	0.013153	0.000611
44	0.026044	7.12E-05	1.145937	0.003134	0.026115	0.013076	0.000594
45	0.025767	8.72E-05	1.159511	0.003926	0.025854	0.012945	0.000575
46	0.025391	0.000106	1.167996	0.004873	0.025497	0.012766	0.000554
47	0.024928	0.000128	1.17161	0.005997	0.025055	0.012545	0.000533
48	0.024388	0.000152	1.170613	0.007319	0.02454	0.012287	0.000511
49	0.023782	0.000181	1.165298	0.008862	0.023962	0.011998	0.000489
50	0.02312	0.000213	1.155984	0.010652	0.023333	0.011683	0.000467
51	0.022412	0.000249	1.143003	0.012713	0.022661	0.011346	0.000444
52	0.021667	0.00029	1.126698	0.015072	0.021957	0.010994	0.000422
53	0.020895	0.000335	1.107414	0.017753	0.02123	0.010629	0.000401
54	0.020102	0.000385	1.085495	0.020784	0.020487	0.010258	0.000379
55	0.019296	0.00044	1.061275	0.024191	0.019736	0.009882	0.000359
56	0.018484	0.0005	1.03508	0.028	0.018984	0.009505	0.000339
57	0.017671	0.000566	1.00722	0.032237	0.018236	0.009131	0.00032
58	0.016862	0.000637	0.97799	0.036927	0.017499	0.008761	0.000302
59	0.016062	0.000713	0.947667	0.042093	0.016776	0.008399	0.000284
60	0.015275	0.000796	0.916509	0.047759	0.016071	0.008047	0.000268
61	0.014504	0.000884	0.884755	0.053945	0.015389	0.007705	0.000252
62	0.013752	0.000979	0.852621	0.060673	0.014731	0.007375	0.000238
63	0.013021	0.001079	0.820308	0.067959	0.014099	0.00706	0.000224
64	0.012312	0.001185	0.787994	0.07582	0.013497	0.006758	0.000211
65	0.011628	0.001296	0.755839	0.084271	0.012925	0.006471	0.000199
66	0.010969	0.001414	0.723985	0.093322	0.012383	0.0062	0.000188
67	0.010337	0.001537	0.692556	0.102984	0.011874	0.005945	0.000177
68	0.00973	0.001666	0.66166	0.113264	0.011396	0.005706	0.000168
69	0.009151	0.0018	0.63139	0.124166	0.01095	0.005483	0.000159
70	0.008597	0.001938	0.601824	0.135692	0.010536	0.005275	0.000151
71	0.008071	0.002082	0.573028	0.147843	0.010153	0.005084	0.000143

72	0.00757	0.002231	0.545054	0.160614	0.009801	0.004907	0.000136
73	0.007095	0.002384	0.517944	0.174001	0.009479	0.004746	0.00013
74	0.006645	0.00254	0.491732	0.187995	0.009185	0.004599	0.000124
75	0.006219	0.002701	0.466438	0.202585	0.00892	0.004466	0.000119
76	0.005817	0.002865	0.44208	0.217759	0.008682	0.004347	0.000114
77	0.005437	0.003032	0.418664	0.233501	0.00847	0.004241	0.00011
78	0.005079	0.003202	0.396192	0.249793	0.008282	0.004147	0.000106
79	0.004743	0.003375	0.37466	0.266615	0.008117	0.004064	0.000103
80	0.004426	0.003549	0.35406	0.283946	0.007975	0.003993	9.97E-05
81	0.004128	0.003725	0.334377	0.301761	0.007854	0.003932	9.7E-05
82	0.003849	0.003903	0.315597	0.320034	0.007752	0.003881	9.45E-05
83	0.003587	0.004081	0.2977	0.338739	0.007668	0.003839	9.24E-05
84	0.003341	0.00426	0.280663	0.357847	0.007601	0.003806	9.05E-05
85	0.003111	0.004439	0.264463	0.377327	0.00755	0.00378	8.88E-05
86	0.002896	0.004618	0.249075	0.397147	0.007514	0.003762	8.74E-05
87	0.002695	0.004796	0.234472	0.417276	0.007491	0.003751	8.61E-05
88	0.002507	0.004974	0.220627	0.437679	0.007481	0.003746	8.5E-05
89	0.002332	0.00515	0.207512	0.458324	0.007481	0.003746	8.41E-05
90	0.002168	0.005324	0.195098	0.479174	0.007492	0.003751	8.32E-05
91	0.002015	0.005497	0.183357	0.500195	0.007512	0.003761	8.25E-05
92	0.001872	0.005667	0.17226	0.521351	0.007539	0.003775	8.19E-05
93	0.00174	0.005834	0.16178	0.542607	0.007574	0.003792	8.14E-05
94	0.001616	0.005999	0.151888	0.563927	0.007615	0.003813	8.1E-05
95	0.001501	0.006161	0.142557	0.585276	0.007661	0.003836	8.06E-05
96	0.001393	0.006319	0.133761	0.606617	0.007712	0.003861	8.03E-05
97	0.001294	0.006473	0.125473	0.627917	0.007767	0.003889	8.01E-05
98	0.001201	0.006624	0.117668	0.649141	0.007825	0.003918	7.98E-05
99	0.001114	0.00677	0.110322	0.670254	0.007885	0.003948	7.96E-05
100	0.001034	0.006912	0.10341	0.691225	0.007946	0.003979	7.95E-05
101	0.00096	0.00705	0.096911	0.71202	0.008009	0.00401	7.93E-05
102	0.00089	0.007182	0.090801	0.732608	0.008073	0.004042	7.91E-05
103	0.000826	0.00731	0.085061	0.752958	0.008136	0.004074	7.9E-05
104	0.000766	0.007433	0.079668	0.773041	0.008199	0.004105	7.88E-05
105	0.000711	0.007551	0.074605	0.792829	0.008261	0.004136	7.87E-05
106	0.000659	0.007663	0.069853	0.812293	0.008322	0.004167	7.85E-05
107	0.000611	0.00777	0.065394	0.831409	0.008381	0.004196	7.83E-05
108	0.000567	0.007872	0.061211	0.850151	0.008439	0.004225	7.81E-05
109	0.000526	0.007968	0.057288	0.868495	0.008493	0.004253	7.79E-05
110	0.000487	0.008058	0.05361	0.88642	0.008546	0.004279	7.77E-05
111	0.000452	0.008143	0.050163	0.903903	0.008595	0.004304	7.74E-05
112	0.000419	0.008223	0.046932	0.920927	0.008642	0.004327	7.72E-05
113	0.000389	0.008296	0.043906	0.937471	0.008685	0.004348	7.69E-05
114	0.00036	0.008364	0.041071	0.953519	0.008724	0.004368	7.65E-05
115	0.000334	0.008427	0.038415	0.969056	0.008761	0.004386	7.62E-05

116	0.00031	0.008483	0.035929	0.984067	0.008793	0.004403	7.58E-05
117	0.000287	0.008535	0.033602	0.99854	0.008822	0.004417	7.54E-05
118	0.000266	0.00858	0.031424	1.012462	0.008846	0.004429	7.5E-05
119	0.000247	0.00862	0.029385	1.025823	0.008867	0.00444	7.45E-05
120	0.000229	0.008655	0.027477	1.038615	0.008884	0.004448	7.4E-05
121	0.000212	0.008685	0.025692	1.050829	0.008897	0.004455	7.35E-05
122	0.000197	0.008709	0.024022	1.062459	0.008906	0.004459	7.3E-05
123	0.000183	0.008728	0.02246	1.0735	0.00891	0.004461	7.24E-05
124	0.000169	0.008742	0.020999	1.083947	0.008911	0.004462	7.19E-05
125	0.000157	0.00875	0.019633	1.093798	0.008907	0.00446	7.13E-05
126	0.000146	0.008754	0.018355	1.10305	0.0089	0.004456	7.06E-05
127	0.000135	0.008754	0.01716	1.111703	0.008889	0.004451	7E-05
128	0.000125	0.008748	0.016043	1.119757	0.008873	0.004443	6.93E-05
129	0.000116	0.008738	0.014999	1.127212	0.008854	0.004433	6.86E-05
130	0.000108	0.008724	0.014023	1.134072	0.008831	0.004422	6.79E-05
131	0.0001	0.008705	0.01311	1.140339	0.008805	0.004409	6.72E-05
132	9.29E-05	0.008682	0.012257	1.146017	0.008775	0.004393	6.65E-05
133	8.62E-05	0.008655	0.011459	1.15111	0.008741	0.004377	6.57E-05
134	8E-05	0.008624	0.010714	1.155625	0.008704	0.004358	6.5E-05
135	7.42E-05	0.008589	0.010017	1.159567	0.008664	0.004338	6.42E-05
136	6.89E-05	0.008551	0.009366	1.162942	0.00862	0.004316	6.34E-05
137	6.39E-05	0.008509	0.008757	1.16576	0.008573	0.004293	6.26E-05
138	5.93E-05	0.008464	0.008188	1.168027	0.008523	0.004268	6.18E-05
139	5.51E-05	0.008415	0.007656	1.169753	0.008471	0.004241	6.09E-05
140	5.11E-05	0.008364	0.00716	1.170946	0.008415	0.004213	6.01E-05
141	4.75E-05	0.008309	0.006695	1.171616	0.008357	0.004184	5.93E-05
142	4.41E-05	0.008252	0.006261	1.171775	0.008296	0.004154	5.84E-05
143	4.09E-05	0.008192	0.005856	1.171431	0.008233	0.004122	5.76E-05
144	3.8E-05	0.008129	0.005476	1.170596	0.008167	0.004089	5.67E-05
145	3.53E-05	0.008064	0.005122	1.169281	0.008099	0.004055	5.59E-05
146	3.28E-05	0.007997	0.004791	1.167497	0.008029	0.00402	5.5E-05
147	3.05E-05	0.007927	0.004481	1.165258	0.007957	0.003984	5.41E-05
148	2.83E-05	0.007855	0.004192	1.162574	0.007884	0.003947	5.33E-05
149	2.63E-05	0.007782	0.003922	1.159457	0.007808	0.003909	5.24E-05
150	2.45E-05	0.007706	0.003669	1.155921	0.007731	0.003871	5.15E-05
151	2.27E-05	0.007629	0.003433	1.151977	0.007652	0.003831	5.07E-05
152	2.11E-05	0.00755	0.003212	1.147639	0.007571	0.003791	4.98E-05
153	1.96E-05	0.00747	0.003005	1.142918	0.00749	0.00375	4.9E-05
154	1.83E-05	0.007388	0.002812	1.137829	0.007407	0.003709	4.81E-05
155	1.7E-05	0.007306	0.002632	1.132383	0.007323	0.003666	4.72E-05
156	1.58E-05	0.007222	0.002463	1.126593	0.007238	0.003624	4.64E-05
157	1.47E-05	0.007137	0.002306	1.120473	0.007151	0.003581	4.56E-05
158	1.37E-05	0.007051	0.002158	1.114035	0.007065	0.003537	4.47E-05
159	1.27E-05	0.006964	0.00202	1.107291	0.006977	0.003493	4.39E-05

160	1.18E-05	0.006877	0.001891	1.100255	0.006888	0.003449	4.31E-05
161	1.1E-05	0.006788	0.001771	1.092938	0.006799	0.003404	4.22E-05
162	1.02E-05	0.0067	0.001658	1.085354	0.00671	0.00336	4.14E-05
163	9.52E-06	0.006611	0.001553	1.077515	0.00662	0.003315	4.06E-05
164	8.87E-06	0.006521	0.001454	1.069432	0.00653	0.003269	3.98E-05
165	8.25E-06	0.006431	0.001362	1.061119	0.006439	0.003224	3.9E-05
166	7.68E-06	0.006341	0.001275	1.052586	0.006349	0.003179	3.82E-05
167	7.15E-06	0.006251	0.001195	1.043846	0.006258	0.003133	3.75E-05
168	6.66E-06	0.00616	0.001119	1.034909	0.006167	0.003088	3.67E-05
169	6.2E-06	0.00607	0.001048	1.025788	0.006076	0.003042	3.6E-05
170	5.78E-06	0.005979	0.000982	1.016494	0.005985	0.002997	3.52E-05
171	5.38E-06	0.005889	0.00092	1.007037	0.005894	0.002951	3.45E-05
172	5.01E-06	0.005799	0.000862	0.997428	0.005804	0.002906	3.37E-05
173	4.67E-06	0.005709	0.000808	0.987677	0.005714	0.002861	3.3E-05
174	4.35E-06	0.00562	0.000757	0.977796	0.005624	0.002816	3.23E-05
175	4.06E-06	0.00553	0.00071	0.967793	0.005534	0.002771	3.16E-05
176	3.78E-06	0.005441	0.000666	0.957679	0.005445	0.002726	3.09E-05
177	3.52E-06	0.005353	0.000624	0.947463	0.005356	0.002682	3.03E-05
178	3.29E-06	0.005265	0.000585	0.937155	0.005268	0.002638	2.96E-05
179	3.06E-06	0.005177	0.000548	0.926763	0.005181	0.002594	2.89E-05
180	2.86E-06	0.005091	0.000514	0.916297	0.005093	0.00255	2.83E-05
181	2.66E-06	0.005004	0.000482	0.905765	0.005007	0.002507	2.77E-05
182	2.49E-06	0.004919	0.000452	0.895175	0.004921	0.002464	2.7E-05
183	2.32E-06	0.004834	0.000424	0.884536	0.004836	0.002421	2.64E-05
184	2.16E-06	0.004749	0.000398	0.873854	0.004751	0.002379	2.58E-05
185	2.02E-06	0.004666	0.000373	0.863139	0.004668	0.002337	2.52E-05
186	1.88E-06	0.004583	0.00035	0.852397	0.004585	0.002296	2.46E-05
187	1.76E-06	0.004501	0.000329	0.841635	0.004502	0.002254	2.41E-05
188	1.64E-06	0.004419	0.000309	0.83086	0.004421	0.002214	2.35E-05
189	1.53E-06	0.004339	0.00029	0.82008	0.004341	0.002173	2.3E-05
190	1.43E-06	0.004259	0.000272	0.809299	0.004261	0.002133	2.24E-05
191	1.34E-06	0.004181	0.000255	0.798525	0.004182	0.002094	2.19E-05
192	1.25E-06	0.004103	0.000239	0.787762	0.004104	0.002055	2.14E-05
193	1.16E-06	0.004026	0.000225	0.777018	0.004027	0.002016	2.09E-05
194	1.09E-06	0.00395	0.000211	0.766298	0.003951	0.001978	2.04E-05
195	1.02E-06	0.003875	0.000198	0.755605	0.003876	0.001941	1.99E-05
196	9.5E-07	0.003801	0.000186	0.744947	0.003802	0.001903	1.94E-05
197	8.88E-07	0.003728	0.000175	0.734327	0.003728	0.001867	1.89E-05
198	8.29E-07	0.003655	0.000164	0.72375	0.003656	0.001831	1.85E-05
199	7.75E-07	0.003584	0.000154	0.713221	0.003585	0.001795	1.8E-05
200	7.25E-07	0.003514	0.000145	0.702743	0.003514	0.00176	1.76E-05
201	6.77E-07	0.003444	0.000136	0.692321	0.003445	0.001725	1.71E-05
202	6.33E-07	0.003376	0.000128	0.681959	0.003377	0.001691	1.67E-05
203	5.92E-07	0.003309	0.00012	0.671659	0.003309	0.001657	1.63E-05

204	5.54E-07	0.003242	0.000113	0.661426	0.003243	0.001624	1.59E-05
205	5.18E-07	0.003177	0.000106	0.651263	0.003177	0.001591	1.55E-05
206	4.85E-07	0.003112	9.99E-05	0.641173	0.003113	0.001559	1.51E-05
207	4.53E-07	0.003049	9.39E-05	0.631158	0.00305	0.001527	1.47E-05
208	4.24E-07	0.002987	8.83E-05	0.621222	0.002987	0.001496	1.44E-05
209	3.97E-07	0.002925	8.3E-05	0.611366	0.002926	0.001465	1.4E-05
210	3.72E-07	0.002865	7.8E-05	0.601595	0.002865	0.001435	1.36E-05
211	3.48E-07	0.002805	7.34E-05	0.591908	0.002806	0.001405	1.33E-05
212	3.26E-07	0.002747	6.9E-05	0.58231	0.002747	0.001375	1.3E-05
213	3.05E-07	0.002689	6.49E-05	0.572801	0.00269	0.001347	1.26E-05
214	2.85E-07	0.002633	6.11E-05	0.563384	0.002633	0.001318	1.23E-05
215	2.67E-07	0.002577	5.75E-05	0.55406	0.002577	0.00129	1.2E-05
216	2.5E-07	0.002522	5.41E-05	0.544831	0.002523	0.001263	1.17E-05
217	2.35E-07	0.002469	5.09E-05	0.535698	0.002469	0.001236	1.14E-05
218	2.2E-07	0.002416	4.79E-05	0.526663	0.002416	0.00121	1.11E-05
219	2.06E-07	0.002364	4.51E-05	0.517726	0.002364	0.001184	1.08E-05
220	1.93E-07	0.002313	4.24E-05	0.508889	0.002313	0.001158	1.05E-05
221	1.81E-07	0.002263	3.99E-05	0.500152	0.002263	0.001133	1.02E-05
222	1.69E-07	0.002214	3.76E-05	0.491518	0.002214	0.001109	9.97E-06
223	1.59E-07	0.002166	3.54E-05	0.482985	0.002166	0.001085	9.71E-06
224	1.49E-07	0.002119	3.33E-05	0.474556	0.002119	0.001061	9.46E-06
225	1.4E-07	0.002072	3.14E-05	0.466229	0.002072	0.001038	9.21E-06
226	1.31E-07	0.002027	2.96E-05	0.458007	0.002027	0.001015	8.97E-06
227	1.23E-07	0.001982	2.79E-05	0.449889	0.001982	0.000992	8.73E-06
228	1.15E-07	0.001938	2.62E-05	0.441876	0.001938	0.00097	8.5E-06
229	1.08E-07	0.001895	2.47E-05	0.433968	0.001895	0.000949	8.28E-06
230	1.01E-07	0.001853	2.33E-05	0.426164	0.001853	0.000928	8.06E-06
231	9.5E-08	0.001812	2.19E-05	0.418466	0.001812	0.000907	7.84E-06
232	8.91E-08	0.001771	2.07E-05	0.410872	0.001771	0.000887	7.63E-06
233	8.37E-08	0.001731	1.95E-05	0.403383	0.001731	0.000867	7.43E-06
234	7.85E-08	0.001692	1.84E-05	0.395999	0.001692	0.000847	7.23E-06
235	7.37E-08	0.001654	1.73E-05	0.38872	0.001654	0.000828	7.04E-06
236	6.92E-08	0.001617	1.63E-05	0.381545	0.001617	0.00081	6.85E-06
237	6.49E-08	0.00158	1.54E-05	0.374473	0.00158	0.000791	6.67E-06
238	6.1E-08	0.001544	1.45E-05	0.367506	0.001544	0.000773	6.49E-06
239	5.73E-08	0.001509	1.37E-05	0.360641	0.001509	0.000756	6.31E-06
240	5.38E-08	0.001474	1.29E-05	0.353879	0.001475	0.000738	6.14E-06
241	5.05E-08	0.001441	1.22E-05	0.347219	0.001441	0.000721	5.98E-06
242	4.74E-08	0.001408	1.15E-05	0.34066	0.001408	0.000705	5.82E-06
243	4.46E-08	0.001375	1.08E-05	0.334203	0.001375	0.000689	5.66E-06
244	4.19E-08	0.001344	1.02E-05	0.327845	0.001344	0.000673	5.51E-06
245	3.94E-08	0.001313	9.64E-06	0.321587	0.001313	0.000657	5.36E-06
246	3.7E-08	0.001282	9.1E-06	0.315428	0.001282	0.000642	5.21E-06
247	3.48E-08	0.001253	8.59E-06	0.309368	0.001253	0.000627	5.07E-06

248	3.27E-08	0.001223	8.1E-06	0.303404	0.001223	0.000613	4.93E-06
249	3.07E-08	0.001195	7.65E-06	0.297537	0.001195	0.000598	4.8E-06
250	2.89E-08	0.001167	7.22E-06	0.291766	0.001167	0.000584	4.67E-06
251	2.72E-08	0.00114	6.82E-06	0.286089	0.00114	0.000571	4.54E-06
252	2.55E-08	0.001113	6.43E-06	0.280506	0.001113	0.000557	4.42E-06
253	2.4E-08	0.001087	6.08E-06	0.275017	0.001087	0.000544	4.3E-06
254	2.26E-08	0.001061	5.74E-06	0.269619	0.001062	0.000531	4.18E-06
255	2.12E-08	0.001037	5.42E-06	0.264313	0.001037	0.000519	4.06E-06
256	2E-08	0.001012	5.12E-06	0.259096	0.001012	0.000507	3.95E-06
257	1.88E-08	0.000988	4.83E-06	0.253969	0.000988	0.000495	3.85E-06
258	1.77E-08	0.000965	4.57E-06	0.24893	0.000965	0.000483	3.74E-06
259	1.67E-08	0.000942	4.31E-06	0.243979	0.000942	0.000472	3.64E-06
260	1.57E-08	0.00092	4.08E-06	0.239114	0.00092	0.00046	3.54E-06
261	1.48E-08	0.000898	3.85E-06	0.234334	0.000898	0.00045	3.44E-06
262	1.39E-08	0.000876	3.64E-06	0.229638	0.000876	0.000439	3.35E-06
263	1.31E-08	0.000856	3.44E-06	0.225025	0.000856	0.000428	3.25E-06
264	1.23E-08	0.000835	3.25E-06	0.220494	0.000835	0.000418	3.16E-06
265	1.16E-08	0.000815	3.07E-06	0.216045	0.000815	0.000408	3.08E-06
266	1.09E-08	0.000796	2.9E-06	0.211675	0.000796	0.000398	2.99E-06
267	1.03E-08	0.000777	2.75E-06	0.207384	0.000777	0.000389	2.91E-06
268	9.69E-09	0.000758	2.6E-06	0.203172	0.000758	0.00038	2.83E-06
269	9.13E-09	0.00074	2.46E-06	0.199036	0.00074	0.00037	2.75E-06
270	8.6E-09	0.000722	2.32E-06	0.194976	0.000722	0.000362	2.67E-06
271	8.1E-09	0.000705	2.2E-06	0.190991	0.000705	0.000353	2.6E-06
272	7.64E-09	0.000688	2.08E-06	0.187079	0.000688	0.000344	2.53E-06
273	7.2E-09	0.000671	1.96E-06	0.18324	0.000671	0.000336	2.46E-06
274	6.78E-09	0.000655	1.86E-06	0.179473	0.000655	0.000328	2.39E-06
275	6.39E-09	0.000639	1.76E-06	0.175776	0.000639	0.00032	2.32E-06
276	6.03E-09	0.000624	1.66E-06	0.172149	0.000624	0.000312	2.26E-06
277	5.68E-09	0.000609	1.57E-06	0.16859	0.000609	0.000305	2.2E-06
278	5.36E-09	0.000594	1.49E-06	0.165098	0.000594	0.000297	2.14E-06
279	5.05E-09	0.000579	1.41E-06	0.161673	0.000579	0.00029	2.08E-06
280	4.77E-09	0.000565	1.33E-06	0.158314	0.000565	0.000283	2.02E-06
281	4.5E-09	0.000552	1.26E-06	0.155018	0.000552	0.000276	1.96E-06
282	4.24E-09	0.000538	1.2E-06	0.151786	0.000538	0.000269	1.91E-06
283	4E-09	0.000525	1.13E-06	0.148617	0.000525	0.000263	1.86E-06
284	3.77E-09	0.000512	1.07E-06	0.145508	0.000512	0.000257	1.8E-06
285	3.56E-09	0.0005	1.01E-06	0.14246	0.0005	0.00025	1.75E-06
286	3.36E-09	0.000488	9.61E-07	0.139472	0.000488	0.000244	1.71E-06
287	3.17E-09	0.000476	9.1E-07	0.136541	0.000476	0.000238	1.66E-06
288	2.99E-09	0.000464	8.62E-07	0.133669	0.000464	0.000232	1.61E-06
289	2.83E-09	0.000453	8.17E-07	0.130852	0.000453	0.000227	1.57E-06
290	2.67E-09	0.000442	7.74E-07	0.128091	0.000442	0.000221	1.52E-06
291	2.52E-09	0.000431	7.33E-07	0.125385	0.000431	0.000216	1.48E-06

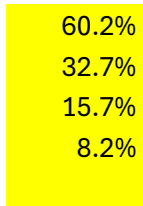
292	2.38E-09	0.00042	6.94E-07	0.122733	0.00042	0.00021	1.44E-06
293	2.25E-09	0.00041	6.58E-07	0.120133	0.00041	0.000205	1.4E-06
294	2.12E-09	0.0004	6.23E-07	0.117585	0.0004	0.0002	1.36E-06
295	2E-09	0.00039	5.91E-07	0.115088	0.00039	0.000195	1.32E-06
296	1.89E-09	0.000381	5.6E-07	0.11264	0.000381	0.000191	1.29E-06
297	1.79E-09	0.000371	5.31E-07	0.110243	0.000371	0.000186	1.25E-06
298	1.69E-09	0.000362	5.03E-07	0.107893	0.000362	0.000181	1.21E-06
299	1.6E-09	0.000353	4.77E-07	0.105591	0.000353	0.000177	1.18E-06
300	1.51E-09	0.000344	4.52E-07	0.103335	0.000344	0.000172	1.15E-06
301	1.42E-09	0.000336	4.29E-07	0.101125	0.000336	0.000168	1.12E-06
302	1.35E-09	0.000328	4.07E-07	0.09896	0.000328	0.000164	1.09E-06
303	1.27E-09	0.00032	3.86E-07	0.096839	0.00032	0.00016	1.05E-06
304	1.2E-09	0.000312	3.66E-07	0.094762	0.000312	0.000156	1.03E-06
305	1.14E-09	0.000304	3.47E-07	0.092727	0.000304	0.000152	9.97E-07
306	1.07E-09	0.000297	3.29E-07	0.090733	0.000297	0.000148	9.69E-07
307	1.02E-09	0.000289	3.12E-07	0.088781	0.000289	0.000145	9.42E-07
308	9.61E-10	0.000282	2.96E-07	0.086869	0.000282	0.000141	9.16E-07
309	9.09E-10	0.000275	2.81E-07	0.084996	0.000275	0.000138	8.9E-07
310	8.6E-10	0.000268	2.66E-07	0.083162	0.000268	0.000134	8.65E-07
311	8.13E-10	0.000262	2.53E-07	0.081366	0.000262	0.000131	8.41E-07
312	7.69E-10	0.000255	2.4E-07	0.079607	0.000255	0.000128	8.18E-07
313	7.28E-10	0.000249	2.28E-07	0.077885	0.000249	0.000125	7.95E-07
314	6.88E-10	0.000243	2.16E-07	0.076199	0.000243	0.000122	7.73E-07
315	6.51E-10	0.000237	2.05E-07	0.074548	0.000237	0.000118	7.51E-07
316	6.16E-10	0.000231	1.95E-07	0.072931	0.000231	0.000116	7.3E-07
317	5.83E-10	0.000225	1.85E-07	0.071348	0.000225	0.000113	7.1E-07
318	5.52E-10	0.000219	1.76E-07	0.069798	0.000219	0.00011	6.9E-07
319	5.23E-10	0.000214	1.67E-07	0.068281	0.000214	0.000107	6.71E-07
320	4.95E-10	0.000209	1.58E-07	0.066796	0.000209	0.000105	6.52E-07
321	4.68E-10	0.000204	1.5E-07	0.065342	0.000204	0.000102	6.34E-07
322	4.43E-10	0.000199	1.43E-07	0.063919	0.000199	9.94E-05	6.16E-07
323	4.2E-10	0.000194	1.36E-07	0.062525	0.000194	9.69E-05	5.99E-07
324	3.98E-10	0.000189	1.29E-07	0.061162	0.000189	9.45E-05	5.83E-07
325	3.76E-10	0.000184	1.22E-07	0.059827	0.000184	9.22E-05	5.66E-07
326	3.57E-10	0.00018	1.16E-07	0.05852	0.00018	8.99E-05	5.51E-07
327	3.38E-10	0.000175	1.1E-07	0.057241	0.000175	8.76E-05	5.35E-07
328	3.2E-10	0.000171	1.05E-07	0.05599	0.000171	8.55E-05	5.2E-07
329	3.03E-10	0.000166	9.97E-08	0.054765	0.000166	8.33E-05	5.06E-07
330	2.87E-10	0.000162	9.48E-08	0.053566	0.000162	8.13E-05	4.92E-07
331	2.72E-10	0.000158	9.01E-08	0.052393	0.000158	7.93E-05	4.78E-07
332	2.58E-10	0.000154	8.56E-08	0.051245	0.000154	7.73E-05	4.65E-07
333	2.44E-10	0.000151	8.14E-08	0.050121	0.000151	7.54E-05	4.52E-07
334	2.32E-10	0.000147	7.73E-08	0.049022	0.000147	7.35E-05	4.39E-07
335	2.19E-10	0.000143	7.35E-08	0.047946	0.000143	7.17E-05	4.27E-07

336	2.08E-10	0.00014	6.99E-08	0.046893	0.00014	6.99E-05	4.15E-07
337	1.97E-10	0.000136	6.65E-08	0.045863	0.000136	6.81E-05	4.04E-07
338	1.87E-10	0.000133	6.32E-08	0.044855	0.000133	6.64E-05	3.93E-07
339	1.77E-10	0.000129	6.01E-08	0.043868	0.000129	6.48E-05	3.82E-07
340	1.68E-10	0.000126	5.71E-08	0.042903	0.000126	6.32E-05	3.71E-07
341	1.59E-10	0.000123	5.44E-08	0.041959	0.000123	6.16E-05	3.61E-07
342	1.51E-10	0.00012	5.17E-08	0.041035	0.00012	6.01E-05	3.51E-07
343	1.43E-10	0.000117	4.92E-08	0.040132	0.000117	5.86E-05	3.41E-07
344	1.36E-10	0.000114	4.68E-08	0.039247	0.000114	5.71E-05	3.32E-07
345	1.29E-10	0.000111	4.45E-08	0.038382	0.000111	5.57E-05	3.22E-07
346	1.22E-10	0.000108	4.23E-08	0.037536	0.000108	5.43E-05	3.14E-07
347	1.16E-10	0.000106	4.03E-08	0.036708	0.000106	5.3E-05	3.05E-07
348	1.1E-10	0.000103	3.83E-08	0.035898	0.000103	5.16E-05	2.96E-07
349	1.05E-10	0.000101	3.65E-08	0.035106	0.000101	5.04E-05	2.88E-07
350	9.92E-11	9.81E-05	3.47E-08	0.034331	9.81E-05	4.91E-05	2.8E-07
351	9.41E-11	9.56E-05	3.3E-08	0.033573	9.56E-05	4.79E-05	2.73E-07
352	8.94E-11	9.33E-05	3.15E-08	0.032831	9.33E-05	4.67E-05	2.65E-07
353	8.48E-11	9.1E-05	2.99E-08	0.032105	9.1E-05	4.55E-05	2.58E-07
354	8.05E-11	8.87E-05	2.85E-08	0.031396	8.87E-05	4.44E-05	2.51E-07
355	7.64E-11	8.65E-05	2.71E-08	0.030702	8.65E-05	4.33E-05	2.44E-07
356	7.26E-11	8.43E-05	2.58E-08	0.030023	8.43E-05	4.22E-05	2.37E-07
357	6.89E-11	8.22E-05	2.46E-08	0.029359	8.22E-05	4.12E-05	2.3E-07
358	6.54E-11	8.02E-05	2.34E-08	0.028709	8.02E-05	4.02E-05	2.24E-07
359	6.21E-11	7.82E-05	2.23E-08	0.028074	7.82E-05	3.92E-05	2.18E-07
360	5.9E-11	7.63E-05	2.12E-08	0.027452	7.63E-05	3.82E-05	2.12E-07
361	5.6E-11	7.44E-05	2.02E-08	0.026845	7.44E-05	3.72E-05	2.06E-07
362	5.32E-11	7.25E-05	1.93E-08	0.02625	7.25E-05	3.63E-05	2E-07
363	5.06E-11	7.07E-05	1.84E-08	0.025669	7.07E-05	3.54E-05	1.95E-07
364	4.8E-11	6.9E-05	1.75E-08	0.0251	6.9E-05	3.45E-05	1.89E-07
365	4.56E-11	6.72E-05	1.67E-08	0.024544	6.72E-05	3.37E-05	1.84E-07
366	4.34E-11	6.56E-05	1.59E-08	0.024	6.56E-05	3.28E-05	1.79E-07
367	4.12E-11	6.39E-05	1.51E-08	0.023468	6.39E-05	3.2E-05	1.74E-07
368	3.92E-11	6.24E-05	1.44E-08	0.022948	6.24E-05	3.12E-05	1.69E-07
369	3.72E-11	6.08E-05	1.37E-08	0.022439	6.08E-05	3.04E-05	1.65E-07
370	3.54E-11	5.93E-05	1.31E-08	0.021942	5.93E-05	2.97E-05	1.6E-07
371	3.36E-11	5.78E-05	1.25E-08	0.021455	5.78E-05	2.9E-05	1.56E-07
372	3.2E-11	5.64E-05	1.19E-08	0.02098	5.64E-05	2.82E-05	1.52E-07
373	3.04E-11	5.5E-05	1.13E-08	0.020514	5.5E-05	2.75E-05	1.47E-07
374	2.89E-11	5.36E-05	1.08E-08	0.020059	5.36E-05	2.69E-05	1.43E-07
375	2.75E-11	5.23E-05	1.03E-08	0.019614	5.23E-05	2.62E-05	1.39E-07
376	2.61E-11	5.1E-05	9.82E-09	0.019179	5.1E-05	2.55E-05	1.36E-07
377	2.48E-11	4.97E-05	9.36E-09	0.018754	4.97E-05	2.49E-05	1.32E-07
378	2.36E-11	4.85E-05	8.93E-09	0.018338	4.85E-05	2.43E-05	1.28E-07
379	2.25E-11	4.73E-05	8.51E-09	0.017931	4.73E-05	2.37E-05	1.25E-07

380	2.14E-11	4.61E-05	8.12E-09	0.017533	4.61E-05	2.31E-05	1.21E-07
381	2.03E-11	4.5E-05	7.74E-09	0.017144	4.5E-05	2.25E-05	1.18E-07
382	1.93E-11	4.39E-05	7.38E-09	0.016764	4.39E-05	2.2E-05	1.15E-07
383	1.84E-11	4.28E-05	7.04E-09	0.016392	4.28E-05	2.14E-05	1.12E-07
384	1.75E-11	4.17E-05	6.72E-09	0.016028	4.17E-05	2.09E-05	1.09E-07
385	1.66E-11	4.07E-05	6.41E-09	0.015672	4.07E-05	2.04E-05	1.06E-07
386	1.58E-11	3.97E-05	6.11E-09	0.015324	3.97E-05	1.99E-05	1.03E-07
387	1.51E-11	3.87E-05	5.83E-09	0.014984	3.87E-05	1.94E-05	1E-07
388	1.43E-11	3.78E-05	5.56E-09	0.014652	3.78E-05	1.89E-05	9.73E-08
389	1.36E-11	3.68E-05	5.31E-09	0.014327	3.68E-05	1.84E-05	9.47E-08
390	1.3E-11	3.59E-05	5.07E-09	0.014009	3.59E-05	1.8E-05	9.21E-08
391	1.24E-11	3.5E-05	4.83E-09	0.013698	3.5E-05	1.75E-05	8.96E-08
392	1.18E-11	3.42E-05	4.61E-09	0.013394	3.42E-05	1.71E-05	8.72E-08
393	1.12E-11	3.33E-05	4.4E-09	0.013097	3.33E-05	1.67E-05	8.48E-08
394	1.07E-11	3.25E-05	4.2E-09	0.012806	3.25E-05	1.63E-05	8.25E-08
395	1.02E-11	3.17E-05	4.01E-09	0.012522	3.17E-05	1.59E-05	8.03E-08
396	9.67E-12	3.09E-05	3.83E-09	0.012244	3.09E-05	1.55E-05	7.81E-08
397	9.21E-12	3.02E-05	3.66E-09	0.011973	3.02E-05	1.51E-05	7.6E-08
398	8.77E-12	2.94E-05	3.49E-09	0.011707	2.94E-05	1.47E-05	7.39E-08
399	8.35E-12	2.87E-05	3.33E-09	0.011448	2.87E-05	1.44E-05	7.19E-08
400	7.96E-12	2.8E-05	3.18E-09	0.011194	2.8E-05	1.4E-05	7E-08
401	7.58E-12	2.73E-05	3.04E-09	0.010945	2.73E-05	1.37E-05	6.81E-08
402	7.22E-12	2.66E-05	2.9E-09	0.010703	2.66E-05	1.33E-05	6.62E-08
403	6.88E-12	2.6E-05	2.77E-09	0.010465	2.6E-05	1.3E-05	6.44E-08
404	6.55E-12	2.53E-05	2.65E-09	0.010233	2.53E-05	1.27E-05	6.27E-08
405	6.24E-12	2.47E-05	2.53E-09	0.010007	2.47E-05	1.24E-05	6.1E-08
406	5.95E-12	2.41E-05	2.42E-09	0.009785	2.41E-05	1.21E-05	5.94E-08
407	5.67E-12	2.35E-05	2.31E-09	0.009568	2.35E-05	1.18E-05	5.78E-08
408	5.4E-12	2.29E-05	2.2E-09	0.009356	2.29E-05	1.15E-05	5.62E-08
409	5.15E-12	2.24E-05	2.11E-09	0.009149	2.24E-05	1.12E-05	5.47E-08
410	4.91E-12	2.18E-05	2.01E-09	0.008946	2.18E-05	1.09E-05	5.32E-08
411	4.68E-12	2.13E-05	1.92E-09	0.008748	2.13E-05	1.07E-05	5.18E-08
412	4.46E-12	2.08E-05	1.84E-09	0.008554	2.08E-05	1.04E-05	5.04E-08
413	4.25E-12	2.03E-05	1.75E-09	0.008365	2.03E-05	1.01E-05	4.9E-08
414	4.05E-12	1.98E-05	1.68E-09	0.00818	1.98E-05	9.89E-06	4.77E-08
415	3.86E-12	1.93E-05	1.6E-09	0.007999	1.93E-05	9.65E-06	4.64E-08
416	3.68E-12	1.88E-05	1.53E-09	0.007821	1.88E-05	9.41E-06	4.52E-08
417	3.51E-12	1.83E-05	1.46E-09	0.007648	1.83E-05	9.18E-06	4.4E-08
418	3.35E-12	1.79E-05	1.4E-09	0.007479	1.79E-05	8.96E-06	4.28E-08
419	3.19E-12	1.75E-05	1.34E-09	0.007314	1.75E-05	8.74E-06	4.17E-08
420	3.05E-12	1.7E-05	1.28E-09	0.007152	1.7E-05	8.53E-06	4.05E-08
421	2.9E-12	1.66E-05	1.22E-09	0.006994	1.66E-05	8.32E-06	3.95E-08
422	2.77E-12	1.62E-05	1.17E-09	0.006839	1.62E-05	8.11E-06	3.84E-08
423	2.64E-12	1.58E-05	1.12E-09	0.006688	1.58E-05	7.92E-06	3.74E-08

424	2.52E-12	1.54E-05	1.07E-09	0.00654	1.54E-05	7.72E-06	3.64E-08
425	2.41E-12	1.5E-05	1.02E-09	0.006396	1.5E-05	7.53E-06	3.54E-08
426	2.29E-12	1.47E-05	9.77E-10	0.006254	1.47E-05	7.35E-06	3.45E-08
427	2.19E-12	1.43E-05	9.35E-10	0.006116	1.43E-05	7.17E-06	3.35E-08
428	2.09E-12	1.4E-05	8.94E-10	0.005981	1.4E-05	7E-06	3.27E-08
429	1.99E-12	1.36E-05	8.55E-10	0.005849	1.36E-05	6.83E-06	3.18E-08
430	1.9E-12	1.33E-05	8.18E-10	0.00572	1.33E-05	6.66E-06	3.09E-08
431	1.82E-12	1.3E-05	7.82E-10	0.005594	1.3E-05	6.5E-06	3.01E-08
432	1.73E-12	1.27E-05	7.49E-10	0.00547	1.27E-05	6.34E-06	2.93E-08
433	1.65E-12	1.24E-05	7.16E-10	0.00535	1.24E-05	6.19E-06	2.85E-08
434	1.58E-12	1.21E-05	6.85E-10	0.005232	1.21E-05	6.04E-06	2.78E-08
435	1.51E-12	1.18E-05	6.56E-10	0.005117	1.18E-05	5.89E-06	2.7E-08
436	1.44E-12	1.15E-05	6.27E-10	0.005004	1.15E-05	5.75E-06	2.63E-08
437	1.37E-12	1.12E-05	6E-10	0.004894	1.12E-05	5.61E-06	2.56E-08
438	1.31E-12	1.09E-05	5.74E-10	0.004786	1.09E-05	5.47E-06	2.49E-08
439	1.25E-12	1.07E-05	5.5E-10	0.00468	1.07E-05	5.34E-06	2.43E-08
440	1.2E-12	1.04E-05	5.26E-10	0.004577	1.04E-05	5.21E-06	2.36E-08
441	1.14E-12	1.02E-05	5.04E-10	0.004477	1.02E-05	5.08E-06	2.3E-08
442	1.09E-12	9.9E-06	4.82E-10	0.004378	9.9E-06	4.96E-06	2.24E-08
443	1.04E-12	9.67E-06	4.61E-10	0.004282	9.67E-06	4.84E-06	2.18E-08
444	9.95E-13	9.43E-06	4.42E-10	0.004188	9.43E-06	4.72E-06	2.12E-08
445	9.5E-13	9.2E-06	4.23E-10	0.004095	9.2E-06	4.61E-06	2.07E-08
446	9.08E-13	8.98E-06	4.05E-10	0.004005	8.98E-06	4.5E-06	2.01E-08
447	8.67E-13	8.76E-06	3.88E-10	0.003917	8.76E-06	4.39E-06	1.96E-08
448	8.28E-13	8.55E-06	3.71E-10	0.003831	8.55E-06	4.28E-06	1.91E-08
449	7.91E-13	8.35E-06	3.55E-10	0.003747	8.35E-06	4.18E-06	1.86E-08
450	7.56E-13	8.14E-06	3.4E-10	0.003665	8.14E-06	4.08E-06	1.81E-08
451	7.22E-13	7.95E-06	3.26E-10	0.003584	7.95E-06	3.98E-06	1.76E-08
452	6.9E-13	7.76E-06	3.12E-10	0.003506	7.76E-06	3.88E-06	1.72E-08
453	6.6E-13	7.57E-06	2.99E-10	0.003429	7.57E-06	3.79E-06	1.67E-08
454	6.3E-13	7.39E-06	2.86E-10	0.003354	7.39E-06	3.7E-06	1.63E-08
455	6.03E-13	7.21E-06	2.74E-10	0.00328	7.21E-06	3.61E-06	1.58E-08
456	5.76E-13	7.04E-06	2.63E-10	0.003208	7.04E-06	3.52E-06	1.54E-08
457	5.51E-13	6.87E-06	2.52E-10	0.003138	6.87E-06	3.44E-06	1.5E-08
458	5.26E-13	6.7E-06	2.41E-10	0.003069	6.7E-06	3.36E-06	1.46E-08
459	5.03E-13	6.54E-06	2.31E-10	0.003002	6.54E-06	3.27E-06	1.42E-08
460	4.81E-13	6.38E-06	2.21E-10	0.002936	6.38E-06	3.2E-06	1.39E-08
461	4.6E-13	6.23E-06	2.12E-10	0.002872	6.23E-06	3.12E-06	1.35E-08
462	4.4E-13	6.08E-06	2.03E-10	0.002809	6.08E-06	3.04E-06	1.32E-08
463	4.2E-13	5.93E-06	1.95E-10	0.002748	5.93E-06	2.97E-06	1.28E-08
464	4.02E-13	5.79E-06	1.87E-10	0.002688	5.79E-06	2.9E-06	1.25E-08
465	3.84E-13	5.65E-06	1.79E-10	0.002629	5.65E-06	2.83E-06	1.22E-08
466	3.68E-13	5.52E-06	1.71E-10	0.002572	5.52E-06	2.76E-06	1.18E-08
467	3.52E-13	5.39E-06	1.64E-10	0.002515	5.39E-06	2.7E-06	1.15E-08

468	3.36E-13	5.26E-06	1.57E-10	0.00246	5.26E-06	2.63E-06	1.12E-08
469	3.22E-13	5.13E-06	1.51E-10	0.002407	5.13E-06	2.57E-06	1.09E-08
470	3.08E-13	5.01E-06	1.45E-10	0.002354	5.01E-06	2.51E-06	1.07E-08
471	2.94E-13	4.89E-06	1.39E-10	0.002303	4.89E-06	2.45E-06	1.04E-08
472	2.82E-13	4.77E-06	1.33E-10	0.002253	4.77E-06	2.39E-06	1.01E-08
473	2.69E-13	4.66E-06	1.27E-10	0.002204	4.66E-06	2.33E-06	9.85E-09
474	2.58E-13	4.55E-06	1.22E-10	0.002156	4.55E-06	2.28E-06	9.59E-09
475	2.47E-13	4.44E-06	1.17E-10	0.002109	4.44E-06	2.22E-06	9.35E-09
476	2.36E-13	4.33E-06	1.12E-10	0.002063	4.33E-06	2.17E-06	9.1E-09
477	2.26E-13	4.23E-06	1.08E-10	0.002018	4.23E-06	2.12E-06	8.87E-09
478	2.16E-13	4.13E-06	1.03E-10	0.001974	4.13E-06	2.07E-06	8.64E-09
479	2.07E-13	4.03E-06	9.9E-11	0.001931	4.03E-06	2.02E-06	8.42E-09
480	1.98E-13	3.94E-06	9.5E-11	0.001889	3.94E-06	1.97E-06	8.2E-09
481	1.89E-13	3.84E-06	9.11E-11	0.001848	3.84E-06	1.92E-06	7.99E-09
482	1.81E-13	3.75E-06	8.74E-11	0.001808	3.75E-06	1.88E-06	7.78E-09
483	1.74E-13	3.66E-06	8.38E-11	0.001769	3.66E-06	1.83E-06	7.58E-09
484	1.66E-13	3.57E-06	8.04E-11	0.00173	3.57E-06	1.79E-06	7.39E-09
485	1.59E-13	3.49E-06	7.71E-11	0.001693	3.49E-06	1.75E-06	7.2E-09
486	1.52E-13	3.41E-06	7.4E-11	0.001656	3.41E-06	1.71E-06	7.01E-09
487	1.46E-13	3.33E-06	7.1E-11	0.00162	3.33E-06	1.67E-06	6.83E-09
488	1.4E-13	3.25E-06	6.81E-11	0.001585	3.25E-06	1.63E-06	6.66E-09
489	1.34E-13	3.17E-06	6.53E-11	0.001551	3.17E-06	1.59E-06	6.48E-09
490	1.28E-13	3.1E-06	6.27E-11	0.001517	3.1E-06	1.55E-06	6.32E-09
491	1.23E-13	3.02E-06	6.02E-11	0.001484	3.02E-06	1.51E-06	6.16E-09
492	1.17E-13	2.95E-06	5.77E-11	0.001452	2.95E-06	1.48E-06	6E-09
493	1.12E-13	2.88E-06	5.54E-11	0.001421	2.88E-06	1.44E-06	5.85E-09
494	1.08E-13	2.81E-06	5.32E-11	0.00139	2.81E-06	1.41E-06	5.7E-09
495	1.03E-13	2.75E-06	5.1E-11	0.00136	2.75E-06	1.38E-06	5.55E-09
496	9.88E-14	2.68E-06	4.9E-11	0.001331	2.68E-06	1.34E-06	5.41E-09
497	9.46E-14	2.62E-06	4.7E-11	0.001302	2.62E-06	1.31E-06	5.27E-09
498	9.06E-14	2.56E-06	4.51E-11	0.001274	2.56E-06	1.28E-06	5.14E-09
499	8.68E-14	2.5E-06	4.33E-11	0.001246	2.5E-06	1.25E-06	5E-09
500	8.32E-14	2.44E-06	4.16E-11	0.001219	2.44E-06	1.22E-06	4.88E-09
501	7.97E-14	2.38E-06	3.99E-11	0.001193	2.38E-06	1.19E-06	4.75E-09
502	7.64E-14	2.33E-06	3.83E-11	0.001167	2.33E-06	1.16E-06	4.63E-09
503	7.32E-14	2.27E-06	3.68E-11	0.001142	2.27E-06	1.14E-06	4.51E-09
504	7.01E-14	2.22E-06	3.53E-11	0.001118	2.22E-06	1.11E-06	4.4E-09
505	6.72E-14	2.17E-06	3.39E-11	0.001094	2.17E-06	1.08E-06	4.29E-09
506	6.44E-14	2.11E-06	3.26E-11	0.00107	2.11E-06	1.06E-06	4.18E-09
507	6.17E-14	2.07E-06	3.13E-11	0.001047	2.07E-06	1.03E-06	4.07E-09
508	5.92E-14	2.02E-06	3.01E-11	0.001024	2.02E-06	1.01E-06	3.97E-09
509	5.67E-14	1.97E-06	2.89E-11	0.001002	1.97E-06	9.86E-07	3.87E-09
510	5.44E-14	1.92E-06	2.77E-11	0.000981	1.92E-06	9.63E-07	3.77E-09



1

n/N

4.61E-27
1.59E-18
2.28E-14
8.56E-12
5.19E-10
1.08E-08
1.12E-07
7.23E-07
3.29E-06
1.15E-05
3.29E-05
8.02E-05
0.000172
0.000331
0.000584
0.000957
0.001473
0.002148
0.00299
0.003998
0.00516
0.006456
0.00786
0.009338
0.010855
0.012375
0.013864

0.015288
0.016619
0.017835
0.018915
0.019846
0.020621
0.021235
0.021688
0.021985
0.022132
0.022138
0.022014
0.021773
0.021427
0.020989
0.020472
0.019889
0.019253
0.018574
0.017864
0.017132
0.016387
0.015638
0.01489
0.01415
0.013423
0.012713
0.012024
0.01136
0.010721
0.01011
0.009528
0.008976
0.008454
0.007962
0.0075
0.007067
0.006663
0.006287
0.005939
0.005616
0.005318
0.005044
0.004792

0.004561
0.004351
0.00416
0.003986
0.003828
0.003686
0.003558
0.003443
0.003341
0.003249
0.003168
0.003096
0.003032
0.002977
0.002928
0.002885
0.002849
0.002817
0.002789
0.002766
0.002746
0.002729
0.002715
0.002702
0.002692
0.002683
0.002676
0.002669
0.002663
0.002657
0.002652
0.002647
0.002642
0.002637
0.002631
0.002625
0.002618
0.002611
0.002603
0.002595
0.002586
0.002575
0.002565
0.002553

0.00254
0.002527
0.002512
0.002497
0.002481
0.002464
0.002446
0.002427
0.002408
0.002388
0.002367
0.002345
0.002323
0.0023
0.002276
0.002252
0.002228
0.002202
0.002177
0.00215
0.002124
0.002097
0.00207
0.002042
0.002014
0.001986
0.001958
0.001929
0.001901
0.001872
0.001843
0.001814
0.001785
0.001756
0.001727
0.001698
0.001669
0.00164
0.001612
0.001583
0.001555
0.001526
0.001498
0.00147

0.001443
0.001415
0.001388
0.001361
0.001334
0.001308
0.001282
0.001256
0.00123
0.001205
0.00118
0.001155
0.001131
0.001107
0.001083
0.00106
0.001037
0.001014
0.000992
0.00097
0.000948
0.000927
0.000906
0.000886
0.000865
0.000845
0.000826
0.000807
0.000788
0.00077
0.000751
0.000734
0.000716
0.000699
0.000682
0.000666
0.00065
0.000634
0.000619
0.000604
0.000589
0.000574
0.00056
0.000546

0.000533
0.000519
0.000506
0.000494
0.000481
0.000469
0.000457
0.000446
0.000434
0.000423
0.000412
0.000402
0.000391
0.000381
0.000371
0.000362
0.000352
0.000343
0.000334
0.000325
0.000317
0.000309
0.000301
0.000293
0.000285
0.000277
0.00027
0.000263
0.000256
0.000249
0.000242
0.000236
0.00023
0.000223
0.000217
0.000212
0.000206
0.0002
0.000195
0.00019
0.000185
0.00018
0.000175
0.00017

0.000165
0.000161
0.000156
0.000152
0.000148
0.000144
0.00014
0.000136
0.000132
0.000129
0.000125
0.000122
0.000119
0.000115
0.000112
0.000109
0.000106
0.000103
0.0001
9.75E-05
9.48E-05
9.22E-05
8.96E-05
8.71E-05
8.47E-05
8.24E-05
8.01E-05
7.79E-05
7.57E-05
7.36E-05
7.16E-05
6.96E-05
6.77E-05
6.58E-05
6.4E-05
6.22E-05
6.05E-05
5.88E-05
5.71E-05
5.55E-05
5.4E-05
5.25E-05
5.1E-05
4.96E-05

4.82E-05
4.69E-05
4.56E-05
4.43E-05
4.31E-05
4.19E-05
4.07E-05
3.96E-05
3.85E-05
3.74E-05
3.64E-05
3.53E-05
3.44E-05
3.34E-05
3.25E-05
3.16E-05
3.07E-05
2.98E-05
2.9E-05
2.82E-05
2.74E-05
2.66E-05
2.59E-05
2.52E-05
2.45E-05
2.38E-05
2.31E-05
2.25E-05
2.19E-05
2.12E-05
2.07E-05
2.01E-05
1.95E-05
1.9E-05
1.85E-05
1.79E-05
1.74E-05
1.7E-05
1.65E-05
1.6E-05
1.56E-05
1.51E-05
1.47E-05
1.43E-05

1.39E-05
1.35E-05
1.32E-05
1.28E-05
1.24E-05
1.21E-05
1.18E-05
1.14E-05
1.11E-05
1.08E-05
1.05E-05
1.02E-05
9.93E-06
9.66E-06
9.39E-06
9.13E-06
8.88E-06
8.63E-06
8.4E-06
8.16E-06
7.94E-06
7.72E-06
7.51E-06
7.3E-06
7.1E-06
6.9E-06
6.71E-06
6.53E-06
6.35E-06
6.17E-06
6E-06
5.84E-06
5.68E-06
5.52E-06
5.37E-06
5.22E-06
5.08E-06
4.94E-06
4.81E-06
4.67E-06
4.55E-06
4.42E-06
4.3E-06
4.18E-06

4.07E-06
3.96E-06
3.85E-06
3.74E-06
3.64E-06
3.54E-06
3.45E-06
3.35E-06
3.26E-06
3.17E-06
3.09E-06
3E-06
2.92E-06
2.84E-06
2.76E-06
2.69E-06
2.62E-06
2.55E-06
2.48E-06
2.41E-06
2.34E-06
2.28E-06
2.22E-06
2.16E-06
2.1E-06
2.04E-06
1.99E-06
1.94E-06
1.88E-06
1.83E-06
1.78E-06
1.74E-06
1.69E-06
1.64E-06
1.6E-06
1.56E-06
1.51E-06
1.47E-06
1.43E-06
1.4E-06
1.36E-06
1.32E-06
1.29E-06
1.25E-06

1.22E-06
1.19E-06
1.15E-06
1.12E-06
1.09E-06
1.07E-06
1.04E-06
1.01E-06
9.82E-07
9.56E-07
9.31E-07
9.06E-07
8.82E-07
8.59E-07
8.36E-07
8.14E-07
7.92E-07
7.71E-07
7.51E-07
7.31E-07
7.12E-07
6.93E-07
6.75E-07
6.57E-07
6.4E-07
6.23E-07
6.06E-07
5.91E-07
5.75E-07
5.6E-07
5.45E-07
5.31E-07
5.17E-07
5.03E-07
4.9E-07
4.77E-07
4.65E-07
4.53E-07
4.41E-07
4.3E-07
4.18E-07
4.07E-07
3.97E-07
3.86E-07

3.76E-07
3.67E-07
3.57E-07
3.48E-07
3.39E-07
3.3E-07
3.22E-07
3.13E-07
3.05E-07
2.97E-07
2.9E-07
2.82E-07
2.75E-07
2.68E-07
2.61E-07
2.54E-07
2.48E-07
2.41E-07
2.35E-07
2.29E-07
2.23E-07
2.17E-07
2.12E-07
2.06E-07
2.01E-07
1.96E-07
1.91E-07
1.86E-07
1.81E-07
1.77E-07
1.72E-07
1.68E-07
1.63E-07
1.59E-07
1.55E-07
1.51E-07
1.47E-07
1.44E-07
1.4E-07
1.36E-07
1.33E-07
1.3E-07
1.26E-07

Son Embodiment 2, Average, Second Sigmas

1st/2nd 1
Stdv 1 0.4
mean 1 3.834
stdv 2 0.37
mean 2 4.9445

L/d 30-70 37.8%
L/d 40-60 20.7%
L/d 80-140 26.2%
L/d 90-120 13.5%

SUM of dist 0.998657 0.998415 50.0 150.0 1.997071 1 0.031009
Av Asp Rat

Aspect	Rati	m1	m2	(L/d)*m1	(L/d)*m2	m1 + m2	m/M	m/A
1	1.12E-20	1.79E-39	1.12E-20	1.79E-39	1.12E-20	5.6E-21	1.12E-20	
2	2.04E-14	1.15E-29	4.07E-14	2.31E-29	2.04E-14	1.02E-14	1.02E-14	
3	2.32E-11	1.24E-24	6.97E-11	3.73E-24	2.32E-11	1.16E-11	7.75E-12	
4	1.84E-09	2.23E-21	7.36E-09	8.91E-21	1.84E-09	9.22E-10	4.6E-10	
5	3.83E-08	4.91E-19	1.91E-07	2.45E-18	3.83E-08	1.92E-08	7.66E-09	
6	3.63E-07	3.07E-17	2.18E-06	1.84E-16	3.63E-07	1.82E-07	6.05E-08	
7	2.07E-06	8.41E-16	1.45E-05	5.89E-15	2.07E-06	1.03E-06	2.95E-07	
8	8.26E-06	1.28E-14	6.61E-05	1.03E-13	8.26E-06	4.14E-06	1.03E-06	
9	2.56E-05	1.28E-13	0.00023	1.15E-12	2.56E-05	1.28E-05	2.84E-06	
10	6.54E-05	9.14E-13	0.000654	9.14E-12	6.54E-05	3.27E-05	6.54E-06	
11	0.000144	5.06E-12	0.001582	5.57E-11	0.000144	7.2E-05	1.31E-05	
12	0.000281	2.28E-11	0.003374	2.73E-10	0.000281	0.000141	2.34E-05	
13	0.0005	8.65E-11	0.006495	1.12E-09	0.0005	0.00025	3.84E-05	
14	0.000821	2.85E-10	0.011492	3.99E-09	0.000821	0.000411	5.86E-05	
15	0.001264	8.36E-10	0.018954	1.25E-08	0.001264	0.000633	8.42E-05	
16	0.001841	2.22E-09	0.029464	3.55E-08	0.001841	0.000922	0.000115	
17	0.002562	5.39E-09	0.043547	9.16E-08	0.002562	0.001283	0.000151	
18	0.003424	1.21E-08	0.06163	2.18E-07	0.003424	0.001714	0.00019	
19	0.004421	2.56E-08	0.084006	4.86E-07	0.004421	0.002214	0.000233	
20	0.005541	5.1E-08	0.110813	1.02E-06	0.005541	0.002774	0.000277	
21	0.006763	9.64E-08	0.142029	2.02E-06	0.006763	0.003387	0.000322	
22	0.008067	1.74E-07	0.177471	3.83E-06	0.008067	0.004039	0.000367	
23	0.009427	3.02E-07	0.216815	6.94E-06	0.009427	0.00472	0.00041	
24	0.010817	5.04E-07	0.259611	1.21E-05	0.010818	0.005417	0.000451	
25	0.012212	8.15E-07	0.305312	2.04E-05	0.012213	0.006116	0.000489	
26	0.013588	1.28E-06	0.353298	3.32E-05	0.01359	0.006805	0.000523	
27	0.014922	1.95E-06	0.402906	5.26E-05	0.014924	0.007473	0.000553	

28	0.016195	2.9E-06	0.453453	8.11E-05	0.016198	0.008111	0.000578
29	0.017388	4.21E-06	0.504263	0.000122	0.017393	0.008709	0.0006
30	0.018489	5.99E-06	0.554682	0.00018	0.018495	0.009261	0.000617
31	0.019487	8.35E-06	0.604095	0.000259	0.019495	0.009762	0.000629
32	0.020373	1.14E-05	0.651942	0.000366	0.020385	0.010207	0.000637
33	0.021143	1.54E-05	0.697723	0.000509	0.021159	0.010595	0.000641
34	0.021794	2.04E-05	0.741005	0.000695	0.021815	0.010923	0.000642
35	0.022326	2.67E-05	0.781423	0.000936	0.022353	0.011193	0.000639
36	0.022741	3.45E-05	0.818684	0.001242	0.022776	0.011405	0.000633
37	0.023042	4.4E-05	0.852562	0.001626	0.023086	0.01156	0.000624
38	0.023234	5.54E-05	0.882895	0.002103	0.023289	0.011662	0.000613
39	0.023323	6.89E-05	0.909581	0.002689	0.023392	0.011713	0.0006
40	0.023314	8.5E-05	0.932576	0.003399	0.023399	0.011717	0.000585
41	0.023217	0.000104	0.951883	0.004254	0.02332	0.011677	0.000569
42	0.023037	0.000126	0.967548	0.005272	0.023162	0.011598	0.000551
43	0.022783	0.000151	0.979656	0.006474	0.022933	0.011483	0.000533
44	0.022462	0.000179	0.988323	0.007882	0.022641	0.011337	0.000515
45	0.022082	0.000212	0.993693	0.009518	0.022294	0.011163	0.000495
46	0.021651	0.000248	0.995927	0.011406	0.021899	0.010965	0.000476
47	0.021175	0.000289	0.995205	0.013568	0.021463	0.010747	0.000457
48	0.020661	0.000334	0.991718	0.016029	0.020995	0.010513	0.000437
49	0.020116	0.000384	0.985664	0.018812	0.0205	0.010265	0.000418
50	0.019545	0.000439	0.977247	0.021941	0.019984	0.010007	0.0004
51	0.018954	0.000499	0.96667	0.025438	0.019453	0.009741	0.000381
52	0.018349	0.000564	0.954136	0.029327	0.018913	0.00947	0.000364
53	0.017733	0.000635	0.939845	0.033629	0.018367	0.009197	0.000347
54	0.017111	0.00071	0.923989	0.038365	0.017821	0.008924	0.00033
55	0.016486	0.000792	0.906757	0.043553	0.017278	0.008652	0.000314
56	0.015863	0.000879	0.888327	0.049212	0.016742	0.008383	0.000299
57	0.015243	0.000971	0.86887	0.055358	0.016215	0.008119	0.000284
58	0.01463	0.001069	0.848546	0.062007	0.015699	0.007861	0.000271
59	0.014026	0.001172	0.827507	0.06917	0.015198	0.00761	0.000258
60	0.013432	0.001281	0.805895	0.076859	0.014713	0.007367	0.000245
61	0.01285	0.001395	0.783839	0.085083	0.014245	0.007133	0.000234
62	0.012282	0.001514	0.761461	0.093848	0.013795	0.006908	0.000223
63	0.011728	0.001637	0.738872	0.103159	0.013366	0.006693	0.000212
64	0.01119	0.001766	0.716174	0.113018	0.012956	0.006488	0.000202
65	0.010669	0.001899	0.693457	0.123426	0.012567	0.006293	0.000193
66	0.010164	0.002036	0.670807	0.13438	0.0122	0.006109	0.000185
67	0.009676	0.002177	0.648296	0.145877	0.011853	0.005935	0.000177
68	0.009206	0.002322	0.625992	0.15791	0.011528	0.005772	0.00017
69	0.008753	0.002471	0.603953	0.17047	0.011224	0.00562	0.000163
70	0.008318	0.002622	0.582232	0.183546	0.01094	0.005478	0.000156
71	0.0079	0.002776	0.560872	0.197127	0.010676	0.005346	0.00015

72	0.007499	0.002933	0.539914	0.211197	0.010432	0.005224	0.000145
73	0.007115	0.003092	0.519389	0.22574	0.010207	0.005111	0.00014
74	0.006748	0.003253	0.499326	0.240738	0.010001	0.005008	0.000135
75	0.006397	0.003416	0.479748	0.256171	0.009812	0.004913	0.000131
76	0.006061	0.003579	0.460673	0.272018	0.009641	0.004827	0.000127
77	0.005742	0.003744	0.442115	0.288256	0.009485	0.00475	0.000123
78	0.005437	0.003908	0.424086	0.304862	0.009345	0.00468	0.00012
79	0.005147	0.004074	0.406593	0.321811	0.00922	0.004617	0.000117
80	0.00487	0.004238	0.38964	0.339076	0.009109	0.004561	0.000114
81	0.004608	0.004403	0.373228	0.35663	0.009011	0.004512	0.000111
82	0.004358	0.004566	0.357359	0.374447	0.008924	0.004469	0.000109
83	0.004121	0.004729	0.342028	0.392497	0.00885	0.004431	0.000107
84	0.003896	0.00489	0.327232	0.410752	0.008786	0.004399	0.000105
85	0.003682	0.005049	0.312964	0.429184	0.008731	0.004372	0.000103
86	0.003479	0.005207	0.299216	0.447761	0.008686	0.004349	0.000101
87	0.003287	0.005362	0.285981	0.466456	0.008649	0.004331	9.94E-05
88	0.003105	0.005514	0.273248	0.485239	0.008619	0.004316	9.79E-05
89	0.002933	0.005664	0.261007	0.50408	0.008596	0.004305	9.66E-05
90	0.002769	0.005811	0.249247	0.522949	0.00858	0.004296	9.53E-05
91	0.002615	0.005954	0.237955	0.541819	0.008569	0.004291	9.42E-05
92	0.002469	0.006094	0.227119	0.560659	0.008563	0.004288	9.31E-05
93	0.00233	0.006231	0.216726	0.579443	0.008561	0.004287	9.21E-05
94	0.0022	0.006363	0.206764	0.598143	0.008563	0.004288	9.11E-05
95	0.002076	0.006492	0.197219	0.616731	0.008568	0.00429	9.02E-05
96	0.001959	0.006616	0.188079	0.635182	0.008576	0.004294	8.93E-05
97	0.001849	0.006737	0.179329	0.653469	0.008586	0.004299	8.85E-05
98	0.001744	0.006853	0.170957	0.671568	0.008597	0.004305	8.77E-05
99	0.001646	0.006964	0.162949	0.689455	0.00861	0.004311	8.7E-05
100	0.001553	0.007071	0.155293	0.707107	0.008624	0.004318	8.62E-05
101	0.001465	0.007173	0.147976	0.724501	0.008638	0.004326	8.55E-05
102	0.001382	0.007271	0.140984	0.741617	0.008653	0.004333	8.48E-05
103	0.001304	0.007363	0.134305	0.758435	0.008667	0.00434	8.41E-05
104	0.00123	0.007451	0.127928	0.774935	0.008681	0.004347	8.35E-05
105	0.00116	0.007534	0.121841	0.791098	0.008695	0.004354	8.28E-05
106	0.001095	0.007612	0.116031	0.806909	0.008707	0.00436	8.21E-05
107	0.001033	0.007686	0.110488	0.82235	0.008718	0.004365	8.15E-05
108	0.000974	0.007754	0.1052	0.837407	0.008728	0.00437	8.08E-05
109	0.000919	0.007817	0.100158	0.852066	0.008736	0.004374	8.01E-05
110	0.000867	0.007876	0.09535	0.866313	0.008742	0.004378	7.95E-05
111	0.000818	0.007929	0.090766	0.880138	0.008747	0.00438	7.88E-05
112	0.000771	0.007978	0.086397	0.893528	0.008749	0.004381	7.81E-05
113	0.000728	0.008022	0.082234	0.906475	0.00875	0.004381	7.74E-05
114	0.000687	0.008061	0.078267	0.91897	0.008748	0.00438	7.67E-05
115	0.000648	0.008096	0.074489	0.931004	0.008743	0.004378	7.6E-05

116	0.000611	0.008126	0.070889	0.942571	0.008737	0.004375	7.53E-05
117	0.000577	0.008151	0.067461	0.953665	0.008728	0.00437	7.46E-05
118	0.000544	0.008172	0.064197	0.964281	0.008716	0.004364	7.39E-05
119	0.000513	0.008188	0.061089	0.974414	0.008702	0.004357	7.31E-05
120	0.000484	0.008201	0.05813	0.984063	0.008685	0.004349	7.24E-05
121	0.000457	0.008208	0.055313	0.993224	0.008666	0.004339	7.16E-05
122	0.000431	0.008212	0.052632	1.001896	0.008644	0.004328	7.08E-05
123	0.000407	0.008212	0.05008	1.010078	0.008619	0.004316	7.01E-05
124	0.000384	0.008208	0.047652	1.01777	0.008592	0.004302	6.93E-05
125	0.000363	0.0082	0.045341	1.024973	0.008563	0.004288	6.85E-05
126	0.000342	0.008188	0.043141	1.031689	0.00853	0.004271	6.77E-05
127	0.000323	0.008173	0.041049	1.037919	0.008496	0.004254	6.69E-05
128	0.000305	0.008154	0.039058	1.043666	0.008459	0.004236	6.61E-05
129	0.000288	0.008131	0.037164	1.048935	0.008419	0.004216	6.53E-05
130	0.000272	0.008106	0.035363	1.053728	0.008378	0.004195	6.44E-05
131	0.000257	0.008077	0.033649	1.05805	0.008334	0.004173	6.36E-05
132	0.000243	0.008045	0.032018	1.061907	0.008287	0.00415	6.28E-05
133	0.000229	0.00801	0.030467	1.065304	0.008239	0.004125	6.19E-05
134	0.000216	0.007972	0.028992	1.068246	0.008188	0.0041	6.11E-05
135	0.000204	0.007931	0.027589	1.07074	0.008136	0.004074	6.03E-05
136	0.000193	0.007888	0.026254	1.072793	0.008081	0.004047	5.94E-05
137	0.000182	0.007842	0.024985	1.074412	0.008025	0.004018	5.86E-05
138	0.000172	0.007794	0.023778	1.075605	0.007967	0.003989	5.77E-05
139	0.000163	0.007744	0.022629	1.076379	0.007907	0.003959	5.69E-05
140	0.000154	0.007691	0.021537	1.076742	0.007845	0.003928	5.6E-05
141	0.000145	0.007636	0.020499	1.076703	0.007782	0.003896	5.52E-05
142	0.000137	0.007579	0.019511	1.07627	0.007717	0.003864	5.43E-05
143	0.00013	0.007521	0.018571	1.075451	0.007651	0.003831	5.35E-05
144	0.000123	0.00746	0.017677	1.074257	0.007583	0.003797	5.27E-05
145	0.000116	0.007398	0.016827	1.072696	0.007514	0.003762	5.18E-05
146	0.00011	0.007334	0.016019	1.070776	0.007444	0.003727	5.1E-05
147	0.000104	0.007269	0.01525	1.068509	0.007373	0.003692	5.02E-05
148	9.81E-05	0.007202	0.014519	1.065902	0.0073	0.003655	4.93E-05
149	9.28E-05	0.007134	0.013823	1.062966	0.007227	0.003619	4.85E-05
150	8.77E-05	0.007065	0.013161	1.059709	0.007152	0.003581	4.77E-05
151	8.3E-05	0.006994	0.012532	1.056143	0.007077	0.003544	4.69E-05
152	7.85E-05	0.006923	0.011933	1.052276	0.007001	0.003506	4.61E-05
153	7.43E-05	0.00685	0.011364	1.048118	0.006925	0.003467	4.53E-05
154	7.03E-05	0.006777	0.010822	1.043679	0.006847	0.003429	4.45E-05
155	6.65E-05	0.006703	0.010307	1.038968	0.00677	0.00339	4.37E-05
156	6.29E-05	0.006628	0.009816	1.033994	0.006691	0.00335	4.29E-05
157	5.96E-05	0.006553	0.00935	1.028769	0.006612	0.003311	4.21E-05
158	5.64E-05	0.006477	0.008906	1.0233	0.006533	0.003271	4.13E-05
159	5.34E-05	0.0064	0.008484	1.017598	0.006453	0.003231	4.06E-05

160	5.05E-05	0.006323	0.008082	1.011672	0.006373	0.003191	3.98E-05
161	4.78E-05	0.006246	0.0077	1.00553	0.006293	0.003151	3.91E-05
162	4.53E-05	0.006168	0.007336	0.999183	0.006213	0.003111	3.84E-05
163	4.29E-05	0.00609	0.00699	0.992639	0.006133	0.003071	3.76E-05
164	4.06E-05	0.006012	0.006661	0.985908	0.006052	0.003031	3.69E-05
165	3.85E-05	0.005933	0.006347	0.978997	0.005972	0.00299	3.62E-05
166	3.64E-05	0.005855	0.006049	0.971916	0.005891	0.00295	3.55E-05
167	3.45E-05	0.005776	0.005765	0.964674	0.005811	0.00291	3.48E-05
168	3.27E-05	0.005698	0.005494	0.957278	0.005731	0.00287	3.41E-05
169	3.1E-05	0.00562	0.005237	0.949737	0.005651	0.00283	3.34E-05
170	2.94E-05	0.005542	0.004992	0.94206	0.005571	0.00279	3.28E-05
171	2.78E-05	0.005463	0.004759	0.934253	0.005491	0.00275	3.21E-05
172	2.64E-05	0.005386	0.004537	0.926325	0.005412	0.00271	3.15E-05
173	2.5E-05	0.005308	0.004326	0.918284	0.005333	0.00267	3.08E-05
174	2.37E-05	0.005231	0.004125	0.910137	0.005254	0.002631	3.02E-05
175	2.25E-05	0.005154	0.003933	0.901891	0.005176	0.002592	2.96E-05
176	2.13E-05	0.005077	0.003751	0.893554	0.005098	0.002553	2.9E-05
177	2.02E-05	0.005001	0.003577	0.885132	0.005021	0.002514	2.84E-05
178	1.92E-05	0.004925	0.003411	0.876632	0.004944	0.002476	2.78E-05
179	1.82E-05	0.00485	0.003254	0.868062	0.004868	0.002437	2.72E-05
180	1.72E-05	0.004775	0.003104	0.859427	0.004792	0.002399	2.66E-05
181	1.64E-05	0.0047	0.002961	0.850733	0.004717	0.002362	2.61E-05
182	1.55E-05	0.004626	0.002825	0.841988	0.004642	0.002324	2.55E-05
183	1.47E-05	0.004553	0.002695	0.833196	0.004568	0.002287	2.5E-05
184	1.4E-05	0.00448	0.002571	0.824364	0.004494	0.00225	2.44E-05
185	1.33E-05	0.004408	0.002454	0.815497	0.004421	0.002214	2.39E-05
186	1.26E-05	0.004337	0.002341	0.806601	0.004349	0.002178	2.34E-05
187	1.19E-05	0.004266	0.002235	0.797681	0.004278	0.002142	2.29E-05
188	1.13E-05	0.004195	0.002133	0.788742	0.004207	0.002106	2.24E-05
189	1.08E-05	0.004126	0.002036	0.779789	0.004137	0.002071	2.19E-05
190	1.02E-05	0.004057	0.001943	0.770826	0.004067	0.002037	2.14E-05
191	9.71E-06	0.003989	0.001855	0.76186	0.003999	0.002002	2.09E-05
192	9.22E-06	0.003921	0.001771	0.752893	0.003931	0.001968	2.05E-05
193	8.76E-06	0.003855	0.001691	0.74393	0.003863	0.001934	2E-05
194	8.32E-06	0.003789	0.001614	0.734976	0.003797	0.001901	1.96E-05
195	7.91E-06	0.003723	0.001542	0.726035	0.003731	0.001868	1.91E-05
196	7.51E-06	0.003659	0.001472	0.717109	0.003666	0.001836	1.87E-05
197	7.14E-06	0.003595	0.001406	0.708204	0.003602	0.001804	1.83E-05
198	6.78E-06	0.003532	0.001343	0.699322	0.003539	0.001772	1.79E-05
199	6.45E-06	0.00347	0.001283	0.690467	0.003476	0.001741	1.75E-05
200	6.13E-06	0.003408	0.001225	0.681642	0.003414	0.00171	1.71E-05
201	5.82E-06	0.003348	0.00117	0.672851	0.003353	0.001679	1.67E-05
202	5.54E-06	0.003288	0.001118	0.664096	0.003293	0.001649	1.63E-05
203	5.26E-06	0.003228	0.001068	0.655381	0.003234	0.001619	1.59E-05

204	5E-06	0.00317	0.001021	0.646707	0.003175	0.00159	1.56E-05
205	4.76E-06	0.003113	0.000975	0.638078	0.003117	0.001561	1.52E-05
206	4.53E-06	0.003056	0.000932	0.629496	0.00306	0.001532	1.49E-05
207	4.3E-06	0.003	0.000891	0.620964	0.003004	0.001504	1.45E-05
208	4.09E-06	0.002945	0.000852	0.612483	0.002949	0.001477	1.42E-05
209	3.89E-06	0.00289	0.000814	0.604056	0.002894	0.001449	1.38E-05
210	3.71E-06	0.002837	0.000778	0.595686	0.00284	0.001422	1.35E-05
211	3.53E-06	0.002784	0.000744	0.587373	0.002787	0.001396	1.32E-05
212	3.35E-06	0.002732	0.000711	0.57912	0.002735	0.00137	1.29E-05
213	3.19E-06	0.00268	0.00068	0.570928	0.002684	0.001344	1.26E-05
214	3.04E-06	0.00263	0.00065	0.562799	0.002633	0.001318	1.23E-05
215	2.89E-06	0.00258	0.000622	0.554735	0.002583	0.001293	1.2E-05
216	2.75E-06	0.002531	0.000595	0.546737	0.002534	0.001269	1.17E-05
217	2.62E-06	0.002483	0.000569	0.538806	0.002486	0.001245	1.15E-05
218	2.5E-06	0.002436	0.000544	0.530943	0.002438	0.001221	1.12E-05
219	2.38E-06	0.002389	0.00052	0.523151	0.002391	0.001197	1.09E-05
220	2.26E-06	0.002343	0.000498	0.515429	0.002345	0.001174	1.07E-05
221	2.15E-06	0.002298	0.000476	0.507778	0.0023	0.001152	1.04E-05
222	2.05E-06	0.002253	0.000456	0.500201	0.002255	0.001129	1.02E-05
223	1.95E-06	0.002209	0.000436	0.492697	0.002211	0.001107	9.92E-06
224	1.86E-06	0.002166	0.000417	0.485267	0.002168	0.001086	9.68E-06
225	1.77E-06	0.002124	0.000399	0.477913	0.002126	0.001064	9.45E-06
226	1.69E-06	0.002082	0.000382	0.470633	0.002084	0.001044	9.22E-06
227	1.61E-06	0.002042	0.000366	0.46343	0.002043	0.001023	9E-06
228	1.54E-06	0.002001	0.00035	0.456304	0.002003	0.001003	8.78E-06
229	1.46E-06	0.001962	0.000335	0.449255	0.001963	0.000983	8.57E-06
230	1.39E-06	0.001923	0.000321	0.442283	0.001924	0.000964	8.37E-06
231	1.33E-06	0.001885	0.000307	0.435389	0.001886	0.000944	8.17E-06
232	1.27E-06	0.001847	0.000294	0.428572	0.001849	0.000926	7.97E-06
233	1.21E-06	0.00181	0.000282	0.421834	0.001812	0.000907	7.78E-06
234	1.15E-06	0.001774	0.00027	0.415175	0.001775	0.000889	7.59E-06
235	1.1E-06	0.001739	0.000258	0.408594	0.00174	0.000871	7.4E-06
236	1.05E-06	0.001704	0.000247	0.402091	0.001705	0.000854	7.22E-06
237	9.99E-07	0.001669	0.000237	0.395667	0.00167	0.000836	7.05E-06
238	9.53E-07	0.001636	0.000227	0.389322	0.001637	0.00082	6.88E-06
239	9.09E-07	0.001603	0.000217	0.383055	0.001604	0.000803	6.71E-06
240	8.67E-07	0.00157	0.000208	0.376866	0.001571	0.000787	6.55E-06
241	8.28E-07	0.001538	0.000199	0.370755	0.001539	0.000771	6.39E-06
242	7.9E-07	0.001507	0.000191	0.364723	0.001508	0.000755	6.23E-06
243	7.53E-07	0.001476	0.000183	0.358768	0.001477	0.00074	6.08E-06
244	7.19E-07	0.001446	0.000175	0.352891	0.001447	0.000725	5.93E-06
245	6.86E-07	0.001417	0.000168	0.347091	0.001417	0.00071	5.79E-06
246	6.55E-07	0.001388	0.000161	0.341367	0.001388	0.000695	5.64E-06
247	6.25E-07	0.001359	0.000154	0.335721	0.00136	0.000681	5.51E-06

248	5.97E-07	0.001331	0.000148	0.33015	0.001332	0.000667	5.37E-06
249	5.7E-07	0.001304	0.000142	0.324656	0.001304	0.000653	5.24E-06
250	5.44E-07	0.001277	0.000136	0.319237	0.001277	0.00064	5.11E-06
251	5.2E-07	0.001251	0.00013	0.313892	0.001251	0.000626	4.98E-06
252	4.96E-07	0.001225	0.000125	0.308623	0.001225	0.000613	4.86E-06
253	4.74E-07	0.001199	0.00012	0.303427	0.0012	0.000601	4.74E-06
254	4.53E-07	0.001174	0.000115	0.298304	0.001175	0.000588	4.63E-06
255	4.32E-07	0.00115	0.00011	0.293255	0.00115	0.000576	4.51E-06
256	4.13E-07	0.001126	0.000106	0.288278	0.001126	0.000564	4.4E-06
257	3.95E-07	0.001103	0.000101	0.283373	0.001103	0.000552	4.29E-06
258	3.77E-07	0.00108	9.73E-05	0.278539	0.00108	0.000541	4.19E-06
259	3.6E-07	0.001057	9.33E-05	0.273776	0.001057	0.000529	4.08E-06
260	3.44E-07	0.001035	8.95E-05	0.269083	0.001035	0.000518	3.98E-06
261	3.29E-07	0.001013	8.59E-05	0.264459	0.001014	0.000508	3.88E-06
262	3.15E-07	0.000992	8.24E-05	0.259905	0.000992	0.000497	3.79E-06
263	3.01E-07	0.000971	7.91E-05	0.255418	0.000971	0.000486	3.69E-06
264	2.87E-07	0.000951	7.59E-05	0.250999	0.000951	0.000476	3.6E-06
265	2.75E-07	0.000931	7.28E-05	0.246647	0.000931	0.000466	3.51E-06
266	2.63E-07	0.000911	6.99E-05	0.242362	0.000911	0.000456	3.43E-06
267	2.51E-07	0.000892	6.71E-05	0.238141	0.000892	0.000447	3.34E-06
268	2.4E-07	0.000873	6.44E-05	0.233986	0.000873	0.000437	3.26E-06
269	2.3E-07	0.000855	6.18E-05	0.229895	0.000855	0.000428	3.18E-06
270	2.2E-07	0.000837	5.93E-05	0.225868	0.000837	0.000419	3.1E-06
271	2.1E-07	0.000819	5.69E-05	0.221903	0.000819	0.00041	3.02E-06
272	2.01E-07	0.000801	5.47E-05	0.218001	0.000802	0.000401	2.95E-06
273	1.92E-07	0.000784	5.25E-05	0.21416	0.000785	0.000393	2.87E-06
274	1.84E-07	0.000768	5.04E-05	0.21038	0.000768	0.000385	2.8E-06
275	1.76E-07	0.000751	4.84E-05	0.20666	0.000752	0.000376	2.73E-06
276	1.68E-07	0.000736	4.65E-05	0.202999	0.000736	0.000368	2.67E-06
277	1.61E-07	0.00072	4.46E-05	0.199397	0.00072	0.000361	2.6E-06
278	1.54E-07	0.000705	4.29E-05	0.195853	0.000705	0.000353	2.53E-06
279	1.48E-07	0.000689	4.12E-05	0.192366	0.00069	0.000345	2.47E-06
280	1.41E-07	0.000675	3.96E-05	0.188935	0.000675	0.000338	2.41E-06
281	1.35E-07	0.00066	3.8E-05	0.185561	0.00066	0.000331	2.35E-06
282	1.29E-07	0.000646	3.65E-05	0.182241	0.000646	0.000324	2.29E-06
283	1.24E-07	0.000632	3.51E-05	0.178976	0.000633	0.000317	2.24E-06
284	1.19E-07	0.000619	3.37E-05	0.175765	0.000619	0.00031	2.18E-06
285	1.14E-07	0.000606	3.24E-05	0.172606	0.000606	0.000303	2.13E-06
286	1.09E-07	0.000593	3.11E-05	0.1695	0.000593	0.000297	2.07E-06
287	1.04E-07	0.00058	2.99E-05	0.166446	0.00058	0.00029	2.02E-06
288	9.98E-08	0.000568	2.87E-05	0.163442	0.000568	0.000284	1.97E-06
289	9.56E-08	0.000555	2.76E-05	0.160489	0.000555	0.000278	1.92E-06
290	9.15E-08	0.000543	2.65E-05	0.157585	0.000543	0.000272	1.87E-06
291	8.77E-08	0.000532	2.55E-05	0.15473	0.000532	0.000266	1.83E-06

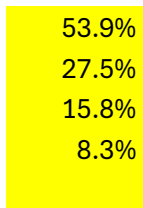
292	8.4E-08	0.00052	2.45E-05	0.151923	0.00052	0.000261	1.78E-06
293	8.05E-08	0.000509	2.36E-05	0.149164	0.000509	0.000255	1.74E-06
294	7.71E-08	0.000498	2.27E-05	0.146452	0.000498	0.000249	1.69E-06
295	7.39E-08	0.000487	2.18E-05	0.143785	0.000487	0.000244	1.65E-06
296	7.08E-08	0.000477	2.1E-05	0.141165	0.000477	0.000239	1.61E-06
297	6.79E-08	0.000467	2.02E-05	0.138589	0.000467	0.000234	1.57E-06
298	6.5E-08	0.000457	1.94E-05	0.136057	0.000457	0.000229	1.53E-06
299	6.23E-08	0.000447	1.86E-05	0.133569	0.000447	0.000224	1.49E-06
300	5.98E-08	0.000437	1.79E-05	0.131123	0.000437	0.000219	1.46E-06
301	5.73E-08	0.000428	1.72E-05	0.12872	0.000428	0.000214	1.42E-06
302	5.49E-08	0.000418	1.66E-05	0.126359	0.000418	0.00021	1.39E-06
303	5.27E-08	0.000409	1.6E-05	0.124038	0.000409	0.000205	1.35E-06
304	5.05E-08	0.000401	1.53E-05	0.121758	0.000401	0.000201	1.32E-06
305	4.84E-08	0.000392	1.48E-05	0.119518	0.000392	0.000196	1.28E-06
306	4.64E-08	0.000383	1.42E-05	0.117316	0.000383	0.000192	1.25E-06
307	4.45E-08	0.000375	1.37E-05	0.115154	0.000375	0.000188	1.22E-06
308	4.27E-08	0.000367	1.32E-05	0.113029	0.000367	0.000184	1.19E-06
309	4.1E-08	0.000359	1.27E-05	0.110942	0.000359	0.00018	1.16E-06
310	3.93E-08	0.000351	1.22E-05	0.108891	0.000351	0.000176	1.13E-06
311	3.77E-08	0.000344	1.17E-05	0.106877	0.000344	0.000172	1.11E-06
312	3.62E-08	0.000336	1.13E-05	0.104898	0.000336	0.000168	1.08E-06
313	3.47E-08	0.000329	1.09E-05	0.102955	0.000329	0.000165	1.05E-06
314	3.33E-08	0.000322	1.05E-05	0.101046	0.000322	0.000161	1.02E-06
315	3.19E-08	0.000315	1.01E-05	0.09917	0.000315	0.000158	1E-06
316	3.06E-08	0.000308	9.69E-06	0.097329	0.000308	0.000154	9.75E-07
317	2.94E-08	0.000301	9.32E-06	0.09552	0.000301	0.000151	9.51E-07
318	2.82E-08	0.000295	8.98E-06	0.093744	0.000295	0.000148	9.27E-07
319	2.71E-08	0.000288	8.64E-06	0.091999	0.000288	0.000144	9.04E-07
320	2.6E-08	0.000282	8.32E-06	0.090286	0.000282	0.000141	8.82E-07
321	2.5E-08	0.000276	8.01E-06	0.088603	0.000276	0.000138	8.6E-07
322	2.4E-08	0.00027	7.72E-06	0.086951	0.00027	0.000135	8.39E-07
323	2.3E-08	0.000264	7.43E-06	0.085328	0.000264	0.000132	8.18E-07
324	2.21E-08	0.000258	7.16E-06	0.083735	0.000258	0.000129	7.98E-07
325	2.12E-08	0.000253	6.9E-06	0.082171	0.000253	0.000127	7.78E-07
326	2.04E-08	0.000247	6.64E-06	0.080635	0.000247	0.000124	7.59E-07
327	1.96E-08	0.000242	6.4E-06	0.079127	0.000242	0.000121	7.4E-07
328	1.88E-08	0.000237	6.16E-06	0.077646	0.000237	0.000119	7.22E-07
329	1.8E-08	0.000232	5.94E-06	0.076192	0.000232	0.000116	7.04E-07
330	1.73E-08	0.000227	5.72E-06	0.074765	0.000227	0.000113	6.87E-07
331	1.67E-08	0.000222	5.51E-06	0.073363	0.000222	0.000111	6.7E-07
332	1.6E-08	0.000217	5.31E-06	0.071988	0.000217	0.000109	6.53E-07
333	1.54E-08	0.000212	5.12E-06	0.070637	0.000212	0.000106	6.37E-07
334	1.48E-08	0.000208	4.93E-06	0.069311	0.000208	0.000104	6.21E-07
335	1.42E-08	0.000203	4.75E-06	0.068009	0.000203	0.000102	6.06E-07

336	1.36E-08	0.000199	4.58E-06	0.066732	0.000199	9.95E-05	5.91E-07
337	1.31E-08	0.000194	4.41E-06	0.065477	0.000194	9.73E-05	5.77E-07
338	1.26E-08	0.00019	4.25E-06	0.064246	0.00019	9.52E-05	5.62E-07
339	1.21E-08	0.000186	4.1E-06	0.063038	0.000186	9.31E-05	5.49E-07
340	1.16E-08	0.000182	3.95E-06	0.061851	0.000182	9.11E-05	5.35E-07
341	1.12E-08	0.000178	3.81E-06	0.060687	0.000178	8.91E-05	5.22E-07
342	1.07E-08	0.000174	3.67E-06	0.059544	0.000174	8.72E-05	5.09E-07
343	1.03E-08	0.00017	3.54E-06	0.058422	0.00017	8.53E-05	4.97E-07
344	9.93E-09	0.000167	3.42E-06	0.057321	0.000167	8.34E-05	4.84E-07
345	9.55E-09	0.000163	3.29E-06	0.056241	0.000163	8.16E-05	4.73E-07
346	9.18E-09	0.000159	3.18E-06	0.05518	0.000159	7.99E-05	4.61E-07
347	8.83E-09	0.000156	3.06E-06	0.054139	0.000156	7.81E-05	4.5E-07
348	8.49E-09	0.000153	2.95E-06	0.053118	0.000153	7.64E-05	4.39E-07
349	8.16E-09	0.000149	2.85E-06	0.052115	0.000149	7.48E-05	4.28E-07
350	7.85E-09	0.000146	2.75E-06	0.051131	0.000146	7.32E-05	4.17E-07
351	7.55E-09	0.000143	2.65E-06	0.050165	0.000143	7.16E-05	4.07E-07
352	7.26E-09	0.00014	2.56E-06	0.049218	0.00014	7E-05	3.97E-07
353	6.98E-09	0.000137	2.47E-06	0.048288	0.000137	6.85E-05	3.88E-07
354	6.72E-09	0.000134	2.38E-06	0.047375	0.000134	6.7E-05	3.78E-07
355	6.46E-09	0.000131	2.29E-06	0.04648	0.000131	6.56E-05	3.69E-07
356	6.22E-09	0.000128	2.21E-06	0.045601	0.000128	6.41E-05	3.6E-07
357	5.98E-09	0.000125	2.14E-06	0.044738	0.000125	6.28E-05	3.51E-07
358	5.76E-09	0.000123	2.06E-06	0.043892	0.000123	6.14E-05	3.42E-07
359	5.54E-09	0.00012	1.99E-06	0.043062	0.00012	6.01E-05	3.34E-07
360	5.33E-09	0.000117	1.92E-06	0.042247	0.000117	5.88E-05	3.26E-07
361	5.13E-09	0.000115	1.85E-06	0.041447	0.000115	5.75E-05	3.18E-07
362	4.94E-09	0.000112	1.79E-06	0.040663	0.000112	5.62E-05	3.1E-07
363	4.75E-09	0.00011	1.72E-06	0.039893	0.00011	5.5E-05	3.03E-07
364	4.57E-09	0.000108	1.66E-06	0.039138	0.000108	5.38E-05	2.95E-07
365	4.4E-09	0.000105	1.61E-06	0.038396	0.000105	5.27E-05	2.88E-07
366	4.24E-09	0.000103	1.55E-06	0.037669	0.000103	5.15E-05	2.81E-07
367	4.08E-09	0.000101	1.5E-06	0.036956	0.000101	5.04E-05	2.74E-07
368	3.93E-09	9.85E-05	1.45E-06	0.036256	9.85E-05	4.93E-05	2.68E-07
369	3.78E-09	9.64E-05	1.4E-06	0.035569	9.64E-05	4.83E-05	2.61E-07
370	3.64E-09	9.43E-05	1.35E-06	0.034895	9.43E-05	4.72E-05	2.55E-07
371	3.51E-09	9.23E-05	1.3E-06	0.034233	9.23E-05	4.62E-05	2.49E-07
372	3.38E-09	9.03E-05	1.26E-06	0.033585	9.03E-05	4.52E-05	2.43E-07
373	3.25E-09	8.83E-05	1.21E-06	0.032948	8.83E-05	4.42E-05	2.37E-07
374	3.13E-09	8.64E-05	1.17E-06	0.032324	8.64E-05	4.33E-05	2.31E-07
375	3.02E-09	8.46E-05	1.13E-06	0.031711	8.46E-05	4.23E-05	2.26E-07
376	2.9E-09	8.27E-05	1.09E-06	0.03111	8.27E-05	4.14E-05	2.2E-07
377	2.8E-09	8.1E-05	1.05E-06	0.03052	8.1E-05	4.05E-05	2.15E-07
378	2.69E-09	7.92E-05	1.02E-06	0.029942	7.92E-05	3.97E-05	2.1E-07
379	2.6E-09	7.75E-05	9.84E-07	0.029374	7.75E-05	3.88E-05	2.05E-07

380	2.5E-09	7.58E-05	9.5E-07	0.028817	7.58E-05	3.8E-05	2E-07
381	2.41E-09	7.42E-05	9.18E-07	0.028271	7.42E-05	3.72E-05	1.95E-07
382	2.32E-09	7.26E-05	8.87E-07	0.027735	7.26E-05	3.64E-05	1.9E-07
383	2.24E-09	7.1E-05	8.57E-07	0.027209	7.1E-05	3.56E-05	1.85E-07
384	2.16E-09	6.95E-05	8.28E-07	0.026693	6.95E-05	3.48E-05	1.81E-07
385	2.08E-09	6.8E-05	8E-07	0.026187	6.8E-05	3.41E-05	1.77E-07
386	2E-09	6.66E-05	7.73E-07	0.025691	6.66E-05	3.33E-05	1.72E-07
387	1.93E-09	6.51E-05	7.47E-07	0.025204	6.51E-05	3.26E-05	1.68E-07
388	1.86E-09	6.37E-05	7.21E-07	0.024726	6.37E-05	3.19E-05	1.64E-07
389	1.79E-09	6.24E-05	6.97E-07	0.024258	6.24E-05	3.12E-05	1.6E-07
390	1.73E-09	6.1E-05	6.74E-07	0.023798	6.1E-05	3.06E-05	1.56E-07
391	1.67E-09	5.97E-05	6.51E-07	0.023347	5.97E-05	2.99E-05	1.53E-07
392	1.61E-09	5.84E-05	6.29E-07	0.022904	5.84E-05	2.93E-05	1.49E-07
393	1.55E-09	5.72E-05	6.08E-07	0.02247	5.72E-05	2.86E-05	1.45E-07
394	1.49E-09	5.6E-05	5.88E-07	0.022044	5.6E-05	2.8E-05	1.42E-07
395	1.44E-09	5.48E-05	5.68E-07	0.021627	5.48E-05	2.74E-05	1.39E-07
396	1.39E-09	5.36E-05	5.49E-07	0.021217	5.36E-05	2.68E-05	1.35E-07
397	1.34E-09	5.24E-05	5.31E-07	0.020815	5.24E-05	2.63E-05	1.32E-07
398	1.29E-09	5.13E-05	5.13E-07	0.020421	5.13E-05	2.57E-05	1.29E-07
399	1.24E-09	5.02E-05	4.96E-07	0.020034	5.02E-05	2.51E-05	1.26E-07
400	1.2E-09	4.91E-05	4.8E-07	0.019655	4.91E-05	2.46E-05	1.23E-07
401	1.16E-09	4.81E-05	4.64E-07	0.019282	4.81E-05	2.41E-05	1.2E-07
402	1.12E-09	4.71E-05	4.49E-07	0.018917	4.71E-05	2.36E-05	1.17E-07
403	1.08E-09	4.61E-05	4.34E-07	0.018559	4.61E-05	2.31E-05	1.14E-07
404	1.04E-09	4.51E-05	4.19E-07	0.018208	4.51E-05	2.26E-05	1.12E-07
405	1E-09	4.41E-05	4.06E-07	0.017863	4.41E-05	2.21E-05	1.09E-07
406	9.66E-10	4.32E-05	3.92E-07	0.017525	4.32E-05	2.16E-05	1.06E-07
407	9.32E-10	4.22E-05	3.79E-07	0.017194	4.22E-05	2.12E-05	1.04E-07
408	8.99E-10	4.13E-05	3.67E-07	0.016868	4.13E-05	2.07E-05	1.01E-07
409	8.68E-10	4.05E-05	3.55E-07	0.016549	4.05E-05	2.03E-05	9.89E-08
410	8.37E-10	3.96E-05	3.43E-07	0.016236	3.96E-05	1.98E-05	9.66E-08
411	8.08E-10	3.88E-05	3.32E-07	0.015929	3.88E-05	1.94E-05	9.43E-08
412	7.8E-10	3.79E-05	3.21E-07	0.015628	3.79E-05	1.9E-05	9.21E-08
413	7.52E-10	3.71E-05	3.11E-07	0.015333	3.71E-05	1.86E-05	8.99E-08
414	7.26E-10	3.63E-05	3.01E-07	0.015043	3.63E-05	1.82E-05	8.78E-08
415	7.01E-10	3.56E-05	2.91E-07	0.014759	3.56E-05	1.78E-05	8.57E-08
416	6.76E-10	3.48E-05	2.81E-07	0.01448	3.48E-05	1.74E-05	8.37E-08
417	6.53E-10	3.41E-05	2.72E-07	0.014206	3.41E-05	1.71E-05	8.17E-08
418	6.3E-10	3.33E-05	2.63E-07	0.013938	3.33E-05	1.67E-05	7.98E-08
419	6.08E-10	3.26E-05	2.55E-07	0.013675	3.26E-05	1.63E-05	7.79E-08
420	5.87E-10	3.19E-05	2.47E-07	0.013417	3.19E-05	1.6E-05	7.61E-08
421	5.67E-10	3.13E-05	2.39E-07	0.013163	3.13E-05	1.57E-05	7.43E-08
422	5.47E-10	3.06E-05	2.31E-07	0.012915	3.06E-05	1.53E-05	7.25E-08
423	5.29E-10	3E-05	2.24E-07	0.012671	3E-05	1.5E-05	7.08E-08

424	5.1E-10	2.93E-05	2.16E-07	0.012432	2.93E-05	1.47E-05	6.92E-08
425	4.93E-10	2.87E-05	2.09E-07	0.012198	2.87E-05	1.44E-05	6.75E-08
426	4.76E-10	2.81E-05	2.03E-07	0.011968	2.81E-05	1.41E-05	6.59E-08
427	4.6E-10	2.75E-05	1.96E-07	0.011742	2.75E-05	1.38E-05	6.44E-08
428	4.44E-10	2.69E-05	1.9E-07	0.011521	2.69E-05	1.35E-05	6.29E-08
429	4.29E-10	2.63E-05	1.84E-07	0.011304	2.63E-05	1.32E-05	6.14E-08
430	4.14E-10	2.58E-05	1.78E-07	0.011091	2.58E-05	1.29E-05	6E-08
431	4E-10	2.52E-05	1.72E-07	0.010882	2.52E-05	1.26E-05	5.86E-08
432	3.86E-10	2.47E-05	1.67E-07	0.010677	2.47E-05	1.24E-05	5.72E-08
433	3.73E-10	2.42E-05	1.62E-07	0.010476	2.42E-05	1.21E-05	5.59E-08
434	3.6E-10	2.37E-05	1.56E-07	0.010279	2.37E-05	1.19E-05	5.46E-08
435	3.48E-10	2.32E-05	1.51E-07	0.010086	2.32E-05	1.16E-05	5.33E-08
436	3.36E-10	2.27E-05	1.47E-07	0.009896	2.27E-05	1.14E-05	5.21E-08
437	3.25E-10	2.22E-05	1.42E-07	0.00971	2.22E-05	1.11E-05	5.08E-08
438	3.14E-10	2.18E-05	1.38E-07	0.009527	2.18E-05	1.09E-05	4.97E-08
439	3.03E-10	2.13E-05	1.33E-07	0.009348	2.13E-05	1.07E-05	4.85E-08
440	2.93E-10	2.08E-05	1.29E-07	0.009173	2.08E-05	1.04E-05	4.74E-08
441	2.83E-10	2.04E-05	1.25E-07	0.009	2.04E-05	1.02E-05	4.63E-08
442	2.74E-10	2E-05	1.21E-07	0.008831	2E-05	1E-05	4.52E-08
443	2.65E-10	1.96E-05	1.17E-07	0.008666	1.96E-05	9.8E-06	4.42E-08
444	2.56E-10	1.92E-05	1.14E-07	0.008503	1.92E-05	9.59E-06	4.31E-08
445	2.47E-10	1.87E-05	1.1E-07	0.008344	1.87E-05	9.39E-06	4.21E-08
446	2.39E-10	1.84E-05	1.07E-07	0.008187	1.84E-05	9.19E-06	4.12E-08
447	2.31E-10	1.8E-05	1.03E-07	0.008034	1.8E-05	9E-06	4.02E-08
448	2.23E-10	1.76E-05	1E-07	0.007883	1.76E-05	8.81E-06	3.93E-08
449	2.16E-10	1.72E-05	9.69E-08	0.007735	1.72E-05	8.63E-06	3.84E-08
450	2.09E-10	1.69E-05	9.39E-08	0.00759	1.69E-05	8.45E-06	3.75E-08
451	2.02E-10	1.65E-05	9.1E-08	0.007448	1.65E-05	8.27E-06	3.66E-08
452	1.95E-10	1.62E-05	8.81E-08	0.007309	1.62E-05	8.1E-06	3.58E-08
453	1.89E-10	1.58E-05	8.54E-08	0.007172	1.58E-05	7.93E-06	3.5E-08
454	1.82E-10	1.55E-05	8.28E-08	0.007038	1.55E-05	7.76E-06	3.41E-08
455	1.76E-10	1.52E-05	8.02E-08	0.006906	1.52E-05	7.6E-06	3.34E-08
456	1.7E-10	1.49E-05	7.77E-08	0.006777	1.49E-05	7.44E-06	3.26E-08
457	1.65E-10	1.46E-05	7.53E-08	0.00665	1.46E-05	7.29E-06	3.18E-08
458	1.59E-10	1.42E-05	7.3E-08	0.006526	1.42E-05	7.14E-06	3.11E-08
459	1.54E-10	1.4E-05	7.07E-08	0.006404	1.4E-05	6.99E-06	3.04E-08
460	1.49E-10	1.37E-05	6.86E-08	0.006285	1.37E-05	6.84E-06	2.97E-08
461	1.44E-10	1.34E-05	6.65E-08	0.006167	1.34E-05	6.7E-06	2.9E-08
462	1.39E-10	1.31E-05	6.44E-08	0.006052	1.31E-05	6.56E-06	2.84E-08
463	1.35E-10	1.28E-05	6.25E-08	0.005939	1.28E-05	6.42E-06	2.77E-08
464	1.3E-10	1.26E-05	6.05E-08	0.005829	1.26E-05	6.29E-06	2.71E-08
465	1.26E-10	1.23E-05	5.87E-08	0.00572	1.23E-05	6.16E-06	2.65E-08
466	1.22E-10	1.2E-05	5.69E-08	0.005613	1.2E-05	6.03E-06	2.59E-08
467	1.18E-10	1.18E-05	5.52E-08	0.005509	1.18E-05	5.91E-06	2.53E-08

468	1.14E-10	1.16E-05	5.35E-08	0.005406	1.16E-05	5.78E-06	2.47E-08
469	1.11E-10	1.13E-05	5.19E-08	0.005306	1.13E-05	5.66E-06	2.41E-08
470	1.07E-10	1.11E-05	5.03E-08	0.005207	1.11E-05	5.55E-06	2.36E-08
471	1.04E-10	1.08E-05	4.88E-08	0.00511	1.08E-05	5.43E-06	2.3E-08
472	1E-10	1.06E-05	4.73E-08	0.005015	1.06E-05	5.32E-06	2.25E-08
473	9.69E-11	1.04E-05	4.58E-08	0.004922	1.04E-05	5.21E-06	2.2E-08
474	9.38E-11	1.02E-05	4.45E-08	0.00483	1.02E-05	5.1E-06	2.15E-08
475	9.08E-11	9.98E-06	4.31E-08	0.004741	9.98E-06	5E-06	2.1E-08
476	8.79E-11	9.77E-06	4.18E-08	0.004653	9.77E-06	4.89E-06	2.05E-08
477	8.5E-11	9.57E-06	4.06E-08	0.004566	9.57E-06	4.79E-06	2.01E-08
478	8.23E-11	9.38E-06	3.93E-08	0.004482	9.38E-06	4.69E-06	1.96E-08
479	7.97E-11	9.18E-06	3.82E-08	0.004399	9.18E-06	4.6E-06	1.92E-08
480	7.71E-11	8.99E-06	3.7E-08	0.004317	8.99E-06	4.5E-06	1.87E-08
481	7.46E-11	8.81E-06	3.59E-08	0.004237	8.81E-06	4.41E-06	1.83E-08
482	7.22E-11	8.63E-06	3.48E-08	0.004159	8.63E-06	4.32E-06	1.79E-08
483	6.99E-11	8.45E-06	3.38E-08	0.004082	8.45E-06	4.23E-06	1.75E-08
484	6.77E-11	8.28E-06	3.28E-08	0.004006	8.28E-06	4.14E-06	1.71E-08
485	6.56E-11	8.11E-06	3.18E-08	0.003932	8.11E-06	4.06E-06	1.67E-08
486	6.35E-11	7.94E-06	3.08E-08	0.003859	7.94E-06	3.98E-06	1.63E-08
487	6.15E-11	7.78E-06	2.99E-08	0.003788	7.78E-06	3.89E-06	1.6E-08
488	5.95E-11	7.62E-06	2.9E-08	0.003718	7.62E-06	3.81E-06	1.56E-08
489	5.76E-11	7.46E-06	2.82E-08	0.003649	7.46E-06	3.74E-06	1.53E-08
490	5.58E-11	7.31E-06	2.73E-08	0.003582	7.31E-06	3.66E-06	1.49E-08
491	5.4E-11	7.16E-06	2.65E-08	0.003516	7.16E-06	3.59E-06	1.46E-08
492	5.23E-11	7.01E-06	2.57E-08	0.003451	7.01E-06	3.51E-06	1.43E-08
493	5.07E-11	6.87E-06	2.5E-08	0.003387	6.87E-06	3.44E-06	1.39E-08
494	4.91E-11	6.73E-06	2.42E-08	0.003325	6.73E-06	3.37E-06	1.36E-08
495	4.75E-11	6.59E-06	2.35E-08	0.003263	6.59E-06	3.3E-06	1.33E-08
496	4.6E-11	6.46E-06	2.28E-08	0.003203	6.46E-06	3.23E-06	1.3E-08
497	4.46E-11	6.33E-06	2.22E-08	0.003144	6.33E-06	3.17E-06	1.27E-08
498	4.32E-11	6.2E-06	2.15E-08	0.003087	6.2E-06	3.1E-06	1.24E-08
499	4.18E-11	6.07E-06	2.09E-08	0.00303	6.07E-06	3.04E-06	1.22E-08
500	4.05E-11	5.95E-06	2.03E-08	0.002974	5.95E-06	2.98E-06	1.19E-08
501	3.93E-11	5.83E-06	1.97E-08	0.002919	5.83E-06	2.92E-06	1.16E-08
502	3.8E-11	5.71E-06	1.91E-08	0.002866	5.71E-06	2.86E-06	1.14E-08
503	3.69E-11	5.59E-06	1.85E-08	0.002813	5.59E-06	2.8E-06	1.11E-08
504	3.57E-11	5.48E-06	1.8E-08	0.002761	5.48E-06	2.74E-06	1.09E-08
505	3.46E-11	5.37E-06	1.75E-08	0.002711	5.37E-06	2.69E-06	1.06E-08
506	3.35E-11	5.26E-06	1.7E-08	0.002661	5.26E-06	2.63E-06	1.04E-08
507	3.25E-11	5.15E-06	1.65E-08	0.002612	5.15E-06	2.58E-06	1.02E-08
508	3.15E-11	5.05E-06	1.6E-08	0.002564	5.05E-06	2.53E-06	9.94E-09
509	3.05E-11	4.95E-06	1.55E-08	0.002517	4.95E-06	2.48E-06	9.72E-09
510	2.96E-11	4.85E-06	1.51E-08	0.002471	4.85E-06	2.43E-06	9.5E-09



1

n/N

3.61E-19

3.28E-13

2.5E-10

1.48E-08

2.47E-07

1.95E-06

9.52E-06

3.33E-05

9.17E-05

0.000211

0.000422

0.000756

0.001239

0.001891

0.002717

0.003712

0.004859

0.006134

0.007505

0.008934

0.010386

0.011825

0.013218

0.014536

0.015755

0.016856

0.017826

0.018656
0.019341
0.019882
0.020281
0.020543
0.020677
0.020691
0.020596
0.020403
0.020122
0.019765
0.019342
0.018865
0.018343
0.017785
0.017199
0.016594
0.015977
0.015352
0.014727
0.014105
0.013492
0.012889
0.012301
0.011729
0.011176
0.010643
0.010131
0.009641
0.009174
0.008729
0.008307
0.007908
0.007531
0.007176
0.006842
0.006528
0.006235
0.005961
0.005705
0.005467
0.005246
0.00504
0.004849

0.004673
0.004509
0.004358
0.004219
0.004091
0.003973
0.003864
0.003764
0.003672
0.003587
0.00351
0.003438
0.003373
0.003313
0.003257
0.003206
0.003159
0.003115
0.003074
0.003037
0.003002
0.002969
0.002938
0.002908
0.002881
0.002854
0.002829
0.002805
0.002781
0.002758
0.002736
0.002714
0.002692
0.00267
0.002649
0.002628
0.002606
0.002585
0.002563
0.002541
0.002519
0.002497
0.002475
0.002452

0.002429
0.002406
0.002382
0.002358
0.002334
0.00231
0.002285
0.00226
0.002235
0.002209
0.002183
0.002157
0.002131
0.002105
0.002078
0.002052
0.002025
0.001998
0.001971
0.001943
0.001916
0.001889
0.001862
0.001834
0.001807
0.00178
0.001753
0.001725
0.001698
0.001671
0.001644
0.001617
0.001591
0.001564
0.001538
0.001511
0.001485
0.00146
0.001434
0.001408
0.001383
0.001358
0.001333
0.001309

0.001285
0.001261
0.001237
0.001213
0.00119
0.001167
0.001145
0.001122
0.0011
0.001078
0.001057
0.001036
0.001015
0.000994
0.000974
0.000954
0.000934
0.000915
0.000896
0.000877
0.000859
0.00084
0.000822
0.000805
0.000788
0.000771
0.000754
0.000738
0.000722
0.000706
0.00069
0.000675
0.00066
0.000646
0.000631
0.000617
0.000603
0.00059
0.000576
0.000563
0.000551
0.000538
0.000526
0.000514

0.000502
0.00049
0.000479
0.000468
0.000457
0.000447
0.000436
0.000426
0.000416
0.000406
0.000397
0.000387
0.000378
0.000369
0.000361
0.000352
0.000344
0.000336
0.000328
0.00032
0.000312
0.000305
0.000297
0.00029
0.000283
0.000276
0.00027
0.000263
0.000257
0.000251
0.000245
0.000239
0.000233
0.000227
0.000222
0.000216
0.000211
0.000206
0.000201
0.000196
0.000191
0.000187
0.000182
0.000178

0.000173
0.000169
0.000165
0.000161
0.000157
0.000153
0.000149
0.000145
0.000142
0.000138
0.000135
0.000132
0.000128
0.000125
0.000122
0.000119
0.000116
0.000113
0.00011
0.000108
0.000105
0.000102
9.99E-05
9.75E-05
9.5E-05
9.27E-05
9.04E-05
8.81E-05
8.6E-05
8.38E-05
8.17E-05
7.97E-05
7.77E-05
7.58E-05
7.39E-05
7.21E-05
7.03E-05
6.85E-05
6.68E-05
6.52E-05
6.36E-05
6.2E-05
6.04E-05
5.89E-05

5.75E-05
5.6E-05
5.46E-05
5.33E-05
5.2E-05
5.07E-05
4.94E-05
4.82E-05
4.7E-05
4.58E-05
4.47E-05
4.36E-05
4.25E-05
4.14E-05
4.04E-05
3.94E-05
3.84E-05
3.75E-05
3.65E-05
3.56E-05
3.48E-05
3.39E-05
3.31E-05
3.22E-05
3.14E-05
3.07E-05
2.99E-05
2.92E-05
2.84E-05
2.77E-05
2.7E-05
2.64E-05
2.57E-05
2.51E-05
2.45E-05
2.39E-05
2.33E-05
2.27E-05
2.21E-05
2.16E-05
2.11E-05
2.05E-05
2E-05
1.95E-05

1.91E-05
1.86E-05
1.81E-05
1.77E-05
1.73E-05
1.68E-05
1.64E-05
1.6E-05
1.56E-05
1.52E-05
1.49E-05
1.45E-05
1.41E-05
1.38E-05
1.35E-05
1.31E-05
1.28E-05
1.25E-05
1.22E-05
1.19E-05
1.16E-05
1.13E-05
1.1E-05
1.08E-05
1.05E-05
1.03E-05
1E-05
9.76E-06
9.53E-06
9.29E-06
9.07E-06
8.85E-06
8.63E-06
8.42E-06
8.22E-06
8.02E-06
7.83E-06
7.64E-06
7.45E-06
7.27E-06
7.1E-06
6.93E-06
6.76E-06
6.6E-06

6.44E-06
6.28E-06
6.13E-06
5.98E-06
5.84E-06
5.7E-06
5.56E-06
5.43E-06
5.3E-06
5.17E-06
5.05E-06
4.92E-06
4.81E-06
4.69E-06
4.58E-06
4.47E-06
4.36E-06
4.26E-06
4.16E-06
4.06E-06
3.96E-06
3.87E-06
3.78E-06
3.69E-06
3.6E-06
3.51E-06
3.43E-06
3.35E-06
3.27E-06
3.19E-06
3.11E-06
3.04E-06
2.97E-06
2.9E-06
2.83E-06
2.76E-06
2.7E-06
2.63E-06
2.57E-06
2.51E-06
2.45E-06
2.4E-06
2.34E-06
2.28E-06

2.23E-06
2.18E-06
2.13E-06
2.08E-06
2.03E-06
1.98E-06
1.93E-06
1.89E-06
1.85E-06
1.8E-06
1.76E-06
1.72E-06
1.68E-06
1.64E-06
1.6E-06
1.56E-06
1.53E-06
1.49E-06
1.46E-06
1.42E-06
1.39E-06
1.36E-06
1.33E-06
1.3E-06
1.27E-06
1.24E-06
1.21E-06
1.18E-06
1.15E-06
1.13E-06
1.1E-06
1.08E-06
1.05E-06
1.03E-06
1E-06
9.8E-07
9.58E-07
9.36E-07
9.14E-07
8.94E-07
8.73E-07
8.53E-07
8.34E-07
8.15E-07

7.96E-07
7.78E-07
7.6E-07
7.43E-07
7.26E-07
7.09E-07
6.93E-07
6.78E-07
6.62E-07
6.47E-07
6.33E-07
6.18E-07
6.04E-07
5.91E-07
5.77E-07
5.64E-07
5.51E-07
5.39E-07
5.27E-07
5.15E-07
5.03E-07
4.92E-07
4.81E-07
4.7E-07
4.6E-07
4.49E-07
4.39E-07
4.3E-07
4.2E-07
4.11E-07
4.01E-07
3.92E-07
3.84E-07
3.75E-07
3.67E-07
3.59E-07
3.51E-07
3.43E-07
3.35E-07
3.28E-07
3.2E-07
3.13E-07
3.06E-07