

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CANDELA CORPORATION,
Petitioner,

v.

NIKOLAI TANKOVICH,
Patent Owner.

IPR2023-00234
Patent 10,675,481 B1

Before SHERIDAN K. SNEDDEN, TINA E. HULSE, and
DEVON ZASTROW NEWMAN, *Administrative Patent Judges*.

SNEDDEN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

This is a Final Written Decision in an *inter partes* review challenging the patentability of claims 1–28 of U.S. Patent No. 10,675,481 B1 (Ex. 1001, “the ’481 patent”). We have jurisdiction under 35 U.S.C. § 6.

Petitioner has the burden of proving unpatentability of the challenged claims by a preponderance of the evidence. 35 U.S.C. § 316(e). Having reviewed the parties’ arguments and cited evidence, for the reasons we discuss below, we conclude that Petitioner has not demonstrated by a preponderance of the evidence that claims 1–28 of the ’481 patent are unpatentable.

A. Procedural History

Candela Corporation (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–28 of the ’481 patent. Paper 1 (“Pet.”). Nikolai Tankovich (“Patent Owner”) filed a Patent Owner Preliminary Response (“Prelim. Resp.”). Paper 7. In view of the then-available record, we instituted an *inter partes* review. Paper 8 (“Inst. Dec.”).

After institution, Patent Owner filed a Response to the Petition. Paper 13 (“PO Resp.”). Petitioner filed a Reply. Paper 15 (“Pet. Reply”). Patent Owner filed a Sur-reply. Paper 17 (“PO Sur-reply”).

On April 3, 2024, we held an oral hearing, the transcript of which is of record. Paper 23 (“Tr.”).

B. Related Matters

The parties identify two litigations, *Tankovich v. Candela Medical, Inc.*, Case No. 8-21-cv-01955 (C.D. Cal. Nov. 29, 2021) (dismissed) and *Tankovich v. Candela Corp.*, Case. No. 1-22-cv-01458 (D. Del. Nov. 4, 2022). Pet. 4; Paper 4, 1.

C. The '481 Patent

The '481 patent discloses a laser system and method for administering multiple beams of laser energy in tissue treatment applications. Ex. 1001, Abstract. According to the Specification, “[t]here are no lasers or laser handpieces on the market today that can simultaneously deliver two or more wavelengths of laser energy in special, fractional form.” *Id.* at 1:12–14. The disclosure explains that “laser treatment usually requires different modalities of energy in order [to] successfully treat the pathologies to which they are applied” but that “sequential application of multiple wavelengths of laser energy compromises the treatment” because treated tissue can experience coagulation and swelling leading to scattering of laser energy in subsequent treatments. *Id.* at 1:16–31. As such, the Specification states “[w]hat is needed in the art therefore is an effective laser therapy system that can simultaneously deliver multiple wavelengths of laser energy through use of a single laser unit without producing interference between the wavelengths within the treated tissue.” *Id.* at 1:53–57.

In the Summary of the Invention, the Specification states:

The invention provides a therapeutic laser system that simultaneously delivers multiple wavelengths of laser energy using a single unit in a single application . . . without producing interference between the wavelengths that typically results when a tissue is treated with multiple wavelengths of laser energy in separate applications [and] can avoid interference of the wavelengths by delivering the wavelengths simultaneously and in spatially separated and overlapping regions of the tissue being treated.

Id. at 1:62–2:4. Through such delivery, the disclosed system reduces compromise of the first treated tissue, permits spatial separation of the beams “such that two wavelengths of laser energy are not applied to the same region of tissue thereby preventing a treated tissue from interfering

with the propagation of a second wavelength of laser treatment,” and permits treatment at different tissue depths. *Id.* at 2:4–19.

An embodiment of the disclosed laser system is depicted in Figure 1 below, which has been rotated 90° clockwise to enable easier reading of the numbering:

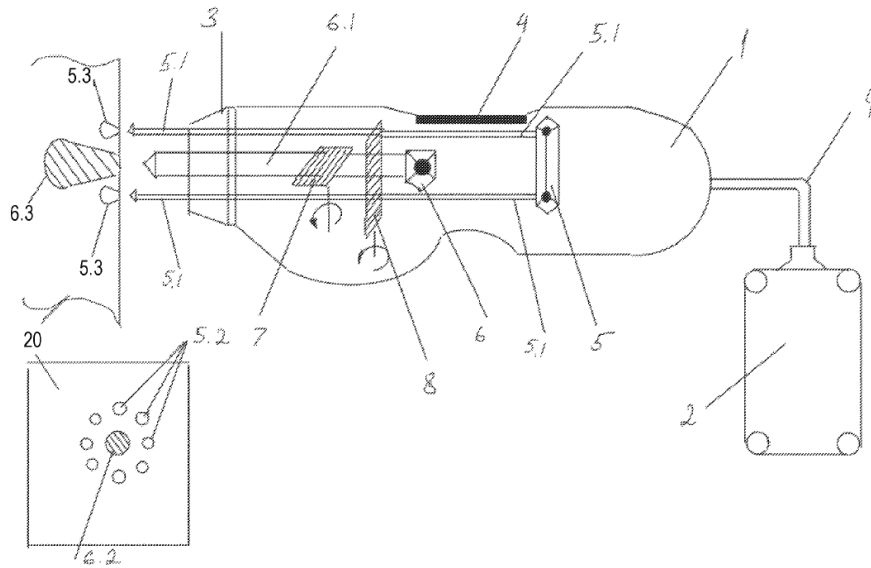


FIG. 1

Figure 1 of the '481 patent, duplicated above, depicts an embodiment of the disclosed laser system. Shown are

a non-limiting beam distribution pattern on skin 20 of a patient wherein fractional scanner 8 is adapted to distribute beam 5.1 according to beam distribution pattern 5.2, and fractional scanner 7 is adapted to distribute beam 6.1 according to beam distribution pattern 6.2, such that beam[] 5.1 contacts skin 20 in a pattern that surrounds the areas of skin 20 that are contacted by beam 6.1. In this pattern, beams 5.1 and 6.1 contact skin 20 in a spatially separated, non-overlapping areas.

Id. at 5:48–56. A mirror can serve as a fractional scanner. *Id.* at 4:53–58.

The '481 patent discloses that methods of treatment using the disclosed laser system comprise applying beams “in the treated tissue in a pattern of overlapping beams, partially overlapping beams, non-overlapping

beams, or combinations thereof” and that the beams can be applied such that they propagate at different tissue depths. *Id.* at 8:51–55.

Various configurations of beam distribution patterns made by the disclosed laser system are depicted in Figure 2 below, which has been rotated 90° clockwise to enable easier reading of the numbering:

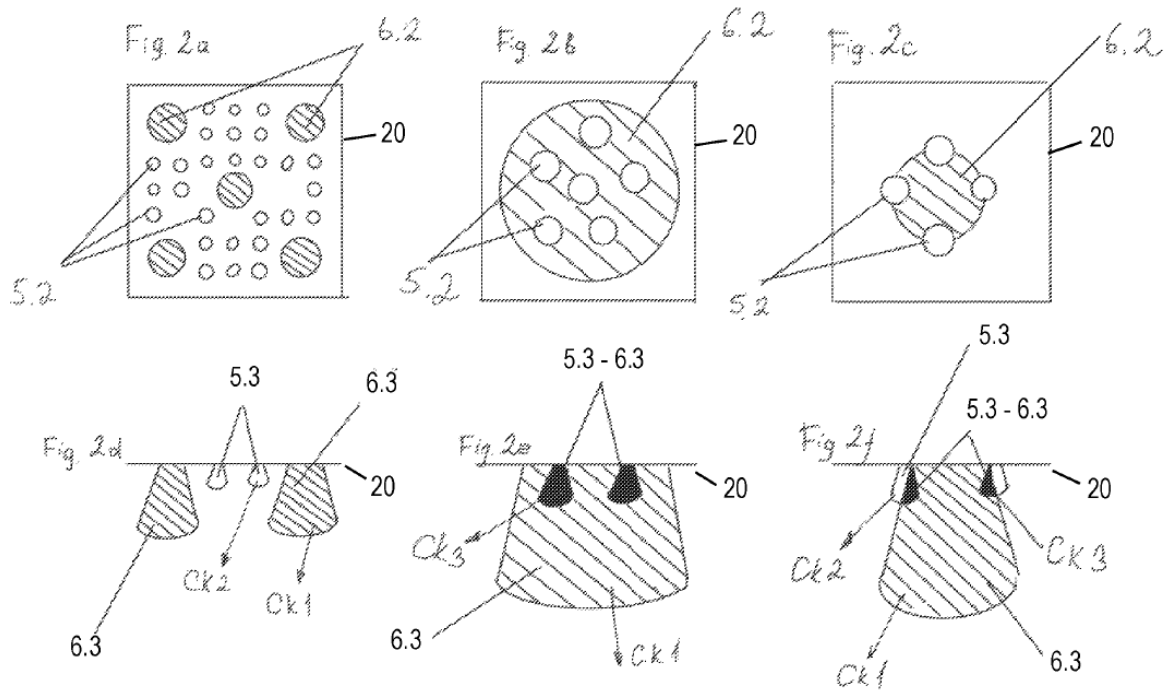


Figure 2 of the '481 patent above discloses various configurations of beam distribution patterns made by the disclosed laser system as follows:

FIG. 2A shows a cross-section of a non-limiting, non-overlapping beam distribution pattern provided by the laser system of the invention.

FIG. 2B shows a cross-section of a non-limiting, fully overlapping beam distribution pattern provided by the laser system of the invention.

FIG. 2C shows a cross-section of a non-limiting, partially overlapping beam distribution pattern provided by the laser system of the invention.

FIG. 2D is a side view of the beam distribution of pattern of FIG. 2A showing the effects of the simultaneous application of non-overlapping wavelengths of laser energy in a tissue.

FIG. 2E is a side view of the beam distribution of pattern of FIG. 2B showing the effects of the simultaneous application of fully overlapping wavelengths of laser energy in a tissue.

FIG. 2F is a side view of the beam distribution of pattern of FIG. 2C showing the effects of the simultaneous application of partially overlapping wavelengths of laser energy in a tissue.

Ex. 1002, 2:25–45. “Beam propagation profile 5.3-6.3 depicts a region of skin wherein overlapping beams 5.1 and 6.1 both propagate within skin 20.” *Id.* at 7:1–3. “FIG. 2F shows the release of cytokine profile CK1 from beam propagation profile 6.3, the release of cytokine profile CK2 from beam propagation profile 5.3, and the release of cytokine profile CK3 from beam propagation profile 5.3-6.3.” *Id.* at 7:3–7.

D. Challenged Claims

Petitioner challenges claims 1–28 of the ’481 patent. Independent claims 1 and 11 are representative and reproduced below:

1. A laser system for administering two or more beams of laser energy for tissue therapy, comprising:
 - a) a first laser in optical communication with a first laser scanner that is adapted to distribute a beam from said first laser in a first pattern; and
 - b) a second laser in optical communication with a second laser scanner that is adapted to distribute a beam from said second laser in a second pattern;
 - c) wherein said first pattern and said second pattern combine to produce overlapping beams and non-overlapping beams.
11. A method of treating a tissue condition, comprising:
 - a) contacting a tissue having a tissue condition with a first

laser beam and a second laser beam, wherein said first laser beam and said second laser beam contact said tissue in a pattern that includes overlapping beams and non-overlapping beams;

b) wherein contacting said tissue with said beams treats said tissue condition.

Ex. 1001, 10:37–47; 11:10–17. Claims 1–10 depend from claim 1 and specify features of the laser system or parameters of the treatment. *Id.* at 10:48–11:9. Claims 12–28 dependent from claim 11 and also specify features of the laser system or parameters of the treatment. *Id.* at 11:18–12:38.

E. Prior Art and Asserted Challenges to Patentability

We instituted trial based on the following grounds of unpatentability:

Ground	Claim(s) Challenged	35 U.S.C. § ¹	Reference(s)/Basis
1	1–28	103	Hsia ² , Black ³
2	23	103	Hsia, Black, Negus ⁴
3	27, 28	103	Hsia, Black, Altshuler ⁵
4	1–28	103	Altshuler, Black
5	23	103	Altshuler, Black, Negus

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the application leading to the ’481 patent was filed after the effective date of these AIA amendments, we apply the AIA version of 35 U.S.C. § 103.

² James C. Hsia, US 2008/0161888 A1, published Jul. 3, 2008 (Ex. 1004, “Hsia”).

³ Michael Black, US2003/0109860 A1, published Jun. 12, 2003 (Ex. 1006, “Black”).

⁴ Daniel K. Negus, et al., WO 2018/106751 A1, published Jun. 14, 2018 (Ex. 1007, “Negus”).

⁵ Gregory B. Altshuler, et al., US 20080294152 A1, published Nov. 27, 2008 (Ex. 1005, “Altshuler”).

Inst. Dec. 2, 31. Petitioner relies on the supporting Declaration of Thomas E. Milner, Ph.D., dated November 18, 2022. Ex. 1002 (“Milner Dec.”). Patent Owner relies on the supporting Declaration of Nathaniel Fried, Ph.D., dated September 15, 2023. Ex. 2001 (“Fried Dec.”).

Petitioner alleges that “Hsia was filed Jan. 3, 2008 and published July 3, 2008. Hsia is prior art to the ’481 patent under at least § 102(a)(1).” *Id.* at 12. Petitioner further asserts that “Altshuler was filed February 15, 2008, and published Nov. 27, 2008, and is prior art to the ’481 patent at least under § 102(a)(1).” *Id.* at 15. Petitioner asserts that “Black was filed December 12, 2001, and published June 12, 2003, and is therefore prior art to the ’481 patent at least under § 102(a)(1).” *Id.* at 16. Petitioner asserts that “Negus was filed December 6, 2017, and published June 14, 2018, and is prior art to the ’481 patent under at least § 102(a)(1).” *Id.* at 18. Patent Owner does not challenge the prior art status of any asserted reference at this time. *See generally* PO Response.

II. ANALYSIS

A. Legal Standards

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). We apply that standard to assess whether Petitioner shows sufficiently that the subject matter of claims 1–28

would have been obvious over the combined disclosures of the asserted references in each ground.

B. Person of Ordinary Skill in the Art

“The level of skill in the art is a factual determination” that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int’l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)). Petitioner, supported by its declarant, offers the following definition of a person of ordinary skill in the art (“POSA” or “POSITA”) at the time of the invention:

A POSA as to the ’481 patent held a bachelor or graduate degree in physics, optics, or biomedical engineering with knowledge of laser systems and the mechanisms of how light interacts with tissues. A POSA would have familiarity with the application of medical laser treatment systems to tissue. Although a POSA would not necessarily hold an M.D. or have experiences treating patients, a POSA would otherwise have knowledge of laser systems and their use to treat individuals, e.g., through experience [*sic, experience*] designing or overseeing implementing animal studies and/or clinical trials. Alternatively, a POSA could have sufficient work experience in these fields to have gained an understanding of the subject matter claimed.

Pet. 19; Ex. 1002 ¶ 77. Patent Owner does not dispute this proposed level of skill, but offers that a “POSA may have alternatively held a degree in electrical engineering.” PO Resp. 10; Ex. 4–10, 13, 15–17.

We adopt Petitioner’s proposed level of ordinary skill in the art because it is consistent with the cited prior art and is undisputed on this record, and also consider Patent Owner’s additional proposal. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (indicating that the prior art itself may reflect an appropriate skill level).

Based on their statements of qualifications and curricula vitae, we find that Petitioner's declarant Dr. Milner, and Patent Owner's declarant Dr. Fried, are each qualified to provide technical opinions from the perspective of a person of ordinary skill in the art in this proceeding. *See* Ex. 1002 (Milner Decl.) ¶¶ 8–18 (Dr. Milner's statement of qualifications); Ex. 1003 (Dr. Milner's curriculum vitae); Ex. 2001 (Fried Decl.) ¶¶ 4–10 (Dr. Fried's statement of qualifications); Ex. 2009 (Dr. Fried's curriculum vitae).

C. Claim Interpretation

We interpret a claim “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). Under this standard, we construe the claim “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.* “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention,” “after reading the entire patent” and its prosecution history. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313, 1321 (Fed. Cir. 2005) (en banc). “There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of the claim term either in the specification or during prosecution.” *Thorner v. Sony Comput. Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). Although extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises can be consulted to understand the meaning of a claim term, extrinsic evidence is less significant than the intrinsic record. *Phillips*, 415 F.3d at 1312–17. Usually, the specification is

dispositive, and is the single best guide to the meaning of a disputed term. *Id.* at 1315.

In its Petition, Petitioner does not propose any interpretation of any claim term. *See generally* Pet.

In our Institution Decision, we noted that the claims do not specify whether simultaneous or sequential delivery of “overlapping and non-overlapping beams” is required by the challenged claims, and determined not to require simultaneous application of beams for purposes of institution. *Id.* We encouraged the parties to address this issue at trial. *Id.* at 15. Below we address the issues raised by the parties and address the question of whether simultaneous or sequential delivery of “overlapping and non-overlapping beams” is required by the challenged claims. PO Resp. 12–15; Reply 5–8; Sur-reply 5–12.

We determine that we need not construe any other claim term in order to resolve the dispute between the parties. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

1. Whether simultaneous or sequential delivery of “overlapping and non-overlapping beams” is required by the claims

Independent claim 1 recites a laser system for administering two or more beams of laser energy comprising first and second laser scanners producing first and second laser beams that create first and second patterns that “combine to produce overlapping beams and non-overlapping beams.” Ex. 1001, 10:37–47 (claim 1). Similarly, independent claim 11 recites a method of treating a tissue condition comprising contacting tissue with a

first and second laser beam “in a pattern that includes overlapping beams and non-overlapping beams.” *Id.* at 11:10–17 (claim 11).

Petitioner suggests that the scope of the claims is broad enough to encompass the sequential delivery of overlapping and non-overlapping beam patterns. *See e.g.*, Pet. 31 (“A POSA would have found it obvious to also apply overlapping beams and non-overlapping beams sequentially when a large area is to be treated or when different patterns are desired.”). Specific to claim 1, Petitioner suggests that the term “combine” as used in claim 1 is broad enough to encompass sequential application of laser light energy. Reply 6.

We have considered Petitioner’s arguments, but agree with Patent Owner that the claims are directed to laser systems and methods of use thereof requiring the simultaneous delivery of overlapping and non-overlapping beam patterns. PO Resp. 12–15. To begin, we note that the plain language of the challenged claims requires a pattern of “overlapping beams and non-overlapping beams,” the execution of which necessitates simultaneous delivery of the laser beams in order to produce overlapping beams and/or non-overlapping beams. Ex. 1001, 10:46–47 (claim 1), 11:14–15 (claim 11). Petitioner’s description of the sequential application of laser beams is more accurately characterized as producing overlapping and non-overlapping treatments areas, not beams. Pet. 30–31; Tr. 35:10–23, 37:6–38:2, 55:19–20.

To the extent there remains any ambiguity in the plain language of the claims, a claim construction requiring the simultaneous delivery of laser beams to produce patterns of overlapping and non-overlapping beams is supported by the Specification of the ’481 patent. “Where the specification makes clear that the invention does not include a particular feature, that

feature is deemed to be outside the reach of the claims of the patent, even though the language of the claims, read without reference to the specification, might be considered broad enough to encompass the feature in question.” *SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1341 (Fed. Cir. 2001). In addition, “repeated derogatory statements” in the specification “are the equivalent of disavowal of that subject matter from the scope of the patent's claims.” *Honeywell Int’l, Inc. v. ITT Indus., Inc.*, 452 F.3d 1312, 1320 (Fed. Cir. 2006).

In this case, the Specification is devoted to the teaching simultaneous delivery of multiple laser beams. The Specification begins by stating that “[t]here are no lasers or laser handpieces on the market today that can simultaneously deliver two or more wavelengths of laser energy in spacial, fractional form.” Ex. 1001, 1:12–14. The Specification explains that “laser treatment usually requires different modalities of energy in order [to] successfully treat the pathologies to which they are applied,” but that “the sequential application of multiple wavelengths of laser energy compromises the treatment.” *Id.* at 1:16–25. The Specification then continues to explain various problems associated with the sequential application of multiple wavelengths. *Id.* at 1:25–52. The Specification concludes its introduction as follows:

What is needed in the art therefore is an effective laser therapy system that can *simultaneously* deliver multiple wavelengths of laser energy through the use of a single laser unit without producing interference between the wavelengths within the treated tissue.

Id. at 1:53–57 (emphasis added).

The Specification summarizes the invention as providing a

therapeutic laser system that *simultaneously* delivers multiple wavelengths of laser energy using a single unit in a single application. The laser system delivers multiple wavelengths of laser energy *without* producing interference between the wavelengths that typically results when a tissue is treated with multiple wavelengths of laser energy in separate applications. The invention can avoid interference of the wavelengths by delivering the wavelengths *simultaneously* and in spatially separated and overlapping regions of the tissue being treated.

Id. at 1:61–2:4 (emphasis added). The Specification further contrasts the invention from systems that require a separate application of subsequent beams. Specifically, the Specification provides that

By delivering the wavelengths simultaneously, the effects of multiple wavelengths of laser energy are produced in the tissue instantaneously thereby eliminating the need for a separate application of a subsequent wavelength which would necessarily be compromised by the earlier application of the preceding treatment wavelength.

Id. at 2:4–9 (emphasis added).

The Specification's focus on providing simultaneous laser beams, while also contrasting the invention with systems using a subsequent application of laser beams, is continued throughout the detailed disclosure of the invention. For example, the Specification provides, in the context of a method for treating a tissue with two or more beams of laser energy, that

By contacting the tissue simultaneously and in spatially separated areas, beams 5.1 and 6.1 are prevented from interfering with one another since each beam contacts tissue that has not been damaged by laser light, it being understood that tissue that has been damaged by laser light can scatter and absorb a subsequent application of laser light and prevent the efficient propagation of the subsequent application of laser light within the tissue.

Id. at 8:29–37 (emphasis added).

Thus, the '481 patent unequivocally informs one skilled in the relevant art to use laser beams simultaneously to overcome problems associated with the sequential application of laser energy. Petitioner asserts that the '481 patent describes simultaneous application of two lasers to treat tissue as “merely an embodiment.” Pet. Reply 6 (citing Ex. 1001, 8:14–19, 2:9–19). We disagree with Petitioner’s interpretation of the cited portions of the Specification. The Specification states in column 8 that “[i]n one embodiment, the method is practiced by providing laser system 1 as disclosed herein.” Ex. 1001, 8:15–17. That the Specification refers to this as “one embodiment” does not necessarily mean the simultaneous use of the laser beams is just an embodiment. Rather, the “embodiment” is the use of laser system 1, as described in the Specification, that delivers beam distributions “disclosed herein.” *Id.* at 8:15–19. Similarly, in column 2, the Specification first explains the benefits of delivering the laser beams simultaneously. Ex. 1001, 2:4–9. The Specification then continues with the portion cited by Petitioner, stating “*In addition*, the laser system of the invention can spatially separate the wavelength beams.” *Id.* at 2:9–11. Thus, when read in context of the Specification as a whole, it is clear that the simultaneous application of the laser beams is the crux of the claimed invention and not “merely an embodiment.”

Petitioner argues that “simultaneous application” is ambiguous in view of the “sequential creation of spots to form the patterns.” Pet. Reply 8. Specifically, Petitioner notes that the '481 patent describes a fractional scanner, such as a rotatable mirror, that moves to create patterns made of a “number of distribution spots.” *Id.* at 3 (citing Ex. 1001, 4:53–5:12). The sequential creation of spots, however, is different than the sequential application of laser beams. In describing the fractional scanners, the

Specification states “fractional scanner 7 can be moved by its motor according to a first pattern that reflects beam 6.1 to achieve beam distribution pattern 6.2, *while* fractional scanner 8 can be moved by its motor according to a second pattern that reflects beam 5.1 to achieve beam distribution pattern 5.2.” Ex. 1001, 4:63–5:1 (emphasis added). Thus, the Specification makes clear that although the individual spots of each pattern may be created sequentially by moving each fractional scanner, the two fractional scanners both move at the same time such that the two beams are creating both beam distribution patterns simultaneously.

Nowhere does the ’481 patent indicate that the invention encompasses the sequential application of laser energy for the treatment of tissue, and indeed, expressly disparages sequential application of laser energy in favor of simultaneous application of multiple beams. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (“[C]laims ‘must be read in view of the specification, of which they are a part.’”) (citing *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995)). Accordingly, having considered the parties’ respective arguments and evidence, we construe the claims to require simultaneous application of the laser beams.

D. Ground 1: Alleged Obviousness of Claims 1–28 over Hsia and Black

1. Petitioner’s Challenge

a) Petitioner’s Arguments Regarding Hsia’s Disclosures

Hsia is titled “Treatment of Skin by Spatial Modulation of Thermal Injury.” Ex. 1004 1(code (54)). Hsia relates to an apparatus and methods for treating skin using “a beam of radiation to cause spatially modulated thermal injury of the skin sufficient to elicit a healing response and

improvement in the skin.” *Id.* ¶ 2. Hsia also discloses treatment with two beams of radiation:

Skin can be treated by delivering a first beam of radiation to a first region of skin to cause a plurality of subsurface volumes of a first thermal injury, which can elicit a healing response from substantially undamaged skin adjacent to the sub-surface volumes of thermal injury. A second beam of radiation can be delivered to a second region of skin to cause a second thermal injury, which can cause the skin to rejuvenate.

Id. ¶ 6.

Petitioner alleges that Hsia discloses a laser system with two or more beams for tissue therapy that is capable of directing each beam to separate areas, and also discloses methods for treatment using the beam. *Id.* at 13 (citing ¶¶ 8–10; Ex. 1002 ¶ 51). Petitioner further alleges that Hsia discloses that the laser beam modulator of Hsia can split a single beam into multiple beams and that the beams can be overlapping or non-overlapping at the skin surface and be directed to different regions below the skin. *Id.* at 13 (citing Ex. 1004 ¶¶ 46–52, Figure 3A; Ex. 1002 ¶ 54). Petitioner alleges that Hsia teaches that the radiation beams can be adjusted to form a pattern by using a modulator and that the beams can overlap “to form the spatially modulated beam of radiation.” *Id.* at 14–15 (citing Ex. 1004 ¶¶ 49, 52, 60, 64, 65, Figures 3B, 4B, 6; Ex. 1002 ¶ 59).

Petitioner alleges that Hsia discloses use of two or more beam sources in treatment. *Id.* at 23 (citing Ex. 1004 ¶ 38). Petitioner also alleges Hsia discloses simultaneous and sequential application of overlapping and non-overlapping beams. *Id.* at 24 (citing Ex. 1004, ¶¶ 65, 68, 69, 73, Figs. 3B, 4B, 6, 7; Ex. 1002 ¶ 104).

b) Petitioner's Arguments Regarding Black's Disclosures

Black is titled “Multiple Laser Treatment.” Ex. 1006, 1 (code (54)). Petitioner alleges that Black relates to a multiple laser treatment apparatus that delivers a beam from two or more lasers that can be selectively combined for treatment of biological tissue. Pet. 16–17, 50 (citing Ex. 1006 ¶¶ 9, 46, 58; Ex. 1002 ¶ 276). Petitioner acknowledges that Hsia does not disclose the use of laser scanners. *See* Pet. at 22 (“A POSA would understand that a scanner can be used in addition to or instead of a modulator to provide adjustability, especially with multiple lasers.”); Ex. 1002 ¶ 93 (same). Rather, Black is relied upon for the scanning feature. Pet. 22; *see also*, Ex. 2002, 145:19–23 (Dr. Milner confirming that, “in my report, I call on Black not for the beam combination but for the scanning feature.”). Petitioner alleges that Black discloses that each laser can have its own scanner and that the device can be controlled to generate various kinds of three-dimensional treatment patterns by controlling rotation of a mirror that reflects the laser beam. *Id.* at 17, 49–50 (citing Ex. 1006 ¶¶ 6, 12, 61, 62; Ex. 1002 ¶¶ 69, 271).

Petitioner further alleges that Black shows three optical components aligned on an optical path to receive laser treatment beams from three lasers. *Id.* at 23 (citing Ex. 1006 ¶ 58, Figure 8; Ex. 1002 ¶ 102). Petitioner alleges Black discloses different wavelengths, penetration depth, and laser beam diameters for treatment beams 520A and 520B. Pet. 26 (citing Ex. 1006 ¶ 54). Petitioner further alleges that Black teaches each laser beam is transmitted to and from a delivery means, such as “an optical device, a micro manipulator or a mirror based optical delivery device.” *Id.* at 22–23 (citing Ex. 1006 ¶ 48; Ex. 1002 ¶¶ 95, 271).

c) Petitioner's Obviousness Allegations

Petitioner argues that the teachings of Hsia and Black in combination render claims 1–28 obvious. Pet. 20–46. In that regard, Petitioner asserts that the ordinarily skilled artisan would have understood that “a scanner can be used in addition to or instead of a modulator to provide adjustability, especially with multiple lasers.” Pet. 22 (citing Ex. 1002 ¶ 93). Petitioner argues the artisan would have looked to Black’s teaching of a system with scanners, each in optical communication with a laser, to direct two or more laser treatment beams simultaneously to treat tissue, thereby meeting the preamble, limitations (a) and (b) of claim 1 and the first half of limitation (a) and limitation (b) of claim 11. *Id.* at 20–23 (citing Ex. 1004 ¶¶ 6, 38, 58, 61, 62, 64; Ex. 1002 ¶¶ 85, 89, 91–95, 101, 102). Petitioner further argues that a skilled artisan would have been familiar with the control and programming of multiple scanners as taught in Black, and that an ordinarily skilled artisan would have been able to implement these features in Hsia’s system without undue experimentation. *Id.* at 22–23 (citing Ex. 1002 ¶¶ 97, 98).

Petitioner alleges the artisan would have understood that the individual laser beams form individual patterns and would have found it obvious “to combine and scan multiple beams into a desired pattern, such as overlapping and non-overlapping.” *Id.* at 23 (citing Ex. 1004, ¶ 6; Ex. 1002 ¶¶ 98, 101). Petitioner next alleges the artisan would have understood that, in some embodiments, regions of a first pattern from a first laser beam would overlap regions of the second pattern from a second beam. *Id.* at 24–25 (citing Ex. 1002 ¶¶ 107, 108). Petitioner further alleges that the artisan would have looked to Black “to provide adjustability for scanners with multiple lasers” because Black “describes simultaneous application of two or more laser treatment beams in patterns,” these teachings in combination

thereby additionally meeting limitation (b) of claim 1 and the first half of limitation (a) of claim 11. *Id.* at 26 (citing Ex. 1006 ¶¶ 18–20, 46, 85; Ex. 1002 ¶ 112).

Petitioner alleges the artisan would have understood from Black that two laser beams could be applied simultaneously “in a non-overlapping pattern, an overlapping pattern, or a combination thereof.” *Id.* at 27 (citing Ex. 1006 ¶¶ 61, 62; Ex. 1002 ¶ 115). Petitioner then alleges the artisan would have been motivated to make the combination to improve safety, decrease treatment times while treating multiple areas of tissue, to modify light scattering for desired therapeutic effects, and to develop a device to use to achieve such benefits, thereby meeting limitation (c) of claim 1, the second half of limitation (a) of claim 11, and limitation (b) of claim 11⁶. *Id.* at 27–28, 36–38 (citing Ex. 1004 ¶¶ 2, 3, 6, 43, 54, 64, Fig. 6; Ex. 1006 ¶¶ 7, 12, 34, 61, 62; Ex. 1002 ¶¶ 116, 118–120, 173, 174–178, 182, 184–186).

Petitioner next alleges that the “specific treatment goal drives the selected beam patterns used for tissue therapy” and that the artisan would have understood how to adjust beams and patterns to produce overlapping and non-overlapping beams while optimizing the location of beam patterns at the desired treatment region such that the subject matter of the challenged claims is an “unsurprising use of known optical elements in a combination that would produce predictable results.” *Id.* at 29–30 (citing Ex. 1002 ¶¶ 121–124). Petitioner also alleges the artisan would have understood that the combination of Hsia and Black teaches sequential production of overlapping and non-overlapping beams, and that using a system made with

⁶ Petitioner incorporates its allegations regarding the teachings of claim 1. Pet. 36–38. Accordingly, we have addressed claim 11 with claim 1.

these teachings to performing multiple passes on, for instance, large treatment areas would have been obvious. *Id.* at 30–31 (citing Ex. 1004 ¶¶ 67–73; Ex. 1002 ¶¶ 125–128).

With regard to claim 11, Petitioner incorporates its allegations regarding the teachings of claim 1. Pet. 36–38⁷. Petitioner also alleges that the combination of Hsia and Black specifically teaches medical treatment of biological tissue using application of multiple laser beams to skin and the benefits of such combined treatment. *Id.* (citing same teachings cited for claim 1).

The dependent claims in this ground recite specific laser wavelengths, laser types and settings, and treatment parameters and strategies. Ex. 1001, 10:48–11:9; 11:18–12:38. Petitioner cites specific teachings in Hsia and Black that teach each limitation of the dependent claims (*id.* at 31–36, 39–46) with declarant support that each limitation would have been perceived as taught by an ordinarily skilled artisan. (Ex. 1002 ¶¶ 132–169, 189–247).

2. Patent Owner's Response

a) Simultaneous beams

Patent Owner contends that Hsia does not teach simultaneously delivering laser beams in different patterns, “[r]ather, Hsia explains that a user must make separate and sequential ‘passes’ or ‘scans’ with a handpiece, each time delivering a single beam of radiation, to create two sets of thermal injuries (i.e., first and second injuries).” PO Resp. 19–21 (citing Ex. 2001 ¶ 73–75; Ex. 1004 ¶ 69 (“The first pass and the second pass can differ by parameters including cooling.”); *id.* ¶ 15 (“[T]he invention can include a

⁷ We have addressed Petitioner’s allegations regarding claim 11 along with Petitioner’s allegation regarding claim 1.

method of (i) . . . a first pass to cause the first thermal injury and (ii) . . . a second pass to cause the second thermal injury”); *id.* at ¶ 50, Fig. 4A); *id.* ¶ 73 (“sequentially applying different combinations of radiation wavelength, intensity, and/or cooling such that a pattern of thermal injury achieved in a given pass is different than that achieved in a subsequent pass”)). Thus, Patent Owner contends that Hsia teaches sequentially applying different combinations of radiation wavelength, intensity, and/or cooling such that a pattern of thermal injury achieved in a given pass is different than that achieved in a subsequent pass. PO Resp. 22.

Patent Owner contends that Petitioner relies on paragraphs 6 and 43 of Hsia to support its contention that Hsia discloses purported benefits associated with simultaneous beam application (*id.* (citing Pet. at 28)), but that Hsia only references “sequentially applying a first laser to a first region of skin in a first pass, and then applying a second laser to a second region of skin in a second pass” (*id.* (emphasis omitted)). Paragraph 6 of Hsia provides,

Skin can be treated by delivering a first beam of radiation to a first region of skin to cause a plurality of sub-surface volumes of a first thermal injury, which can elicit a healing response from substantially undamaged skin adjacent to the sub-surface volumes of thermal injury. A second beam of radiation can be delivered to a second region of skin to cause a second thermal injury, which can cause the skin to rejuvenate (e.g., mitigate wrinkles, age spots, and/or other characteristics associated with aged skin).

Ex. 1004 ¶ 6. Paragraph 43 of Hsia provides,

In various embodiments, a desired penetration depth of light into the skin (and a corresponding depth of thermal injury) can be targeted by selecting a wavelength of a beam of radiation. For example, a water absorption coefficient can be taken from G. M. Hale and M. R. Querry, “Optical constants of water in the 200

nm to 200 μm wavelength region,” Appl. Opt., 12, 555-563, (1973) and an Optical Penetration Depth (OPD) can be calculated using a diffusion approximation. As described above, μ_a of skin is taken as μ_a of water multiplied by 0.7. The product of scattering coefficient and (1-anisotropy factor) is taken as 12 cm^{-1} .

Id. ¶ 43; *see also* PO Resp. 22 (“paragraph 43 identifies different wavelengths that could be used without mentioning anything about benefits, much less those associated with simultaneous delivery of laser beams).

b) Fully overlapping beam patterns

Patent Owner contends that “Hsia’s figures [3B and 4B] do not disclose any overlap of beams—whether partial or fully—because Hsia’s beams are provided in different passes and do not exist on the skin at the same time.” PO Resp. 24 (citing Pet. 14, 25–26).

c) Laser scanners

Patent Owner contends that “Petitioner relies on the embodiments depicted in Figures 5 and 8 to argue that Black teaches using multiple lasers with their own scanners to form multiple beam patterns” (PO Resp. 26 (citing Pet. 16–18), but that the teachings relied upon by Petitioner “do not discuss or disclose anything other than co-aligning the beams along a single combined beam path” (*id.* at 28).

d) Treatment patterns that include both overlapping and non-overlapping beams

Patent Owner contends,

to the extent that Black discloses any scanning, it is certainly not used to create different treatment patterns. Ex. 2001 ¶ 97. Rather, Black’s teachings regarding rotating mirrors make clear that these mirrors are being used to co-align beams to provide a single combined beam for treatment, not for creating different treatment patterns. *Id.*

PO Resp. 33. Thus, the combination of Black with Hsia “would not result in a device with any different capabilities” as Hsia’s device is designed to deliver a treatment beam. *Id.* at 33–34 (citing Ex. 2001 ¶¶ 95–97 (Dr. Fried stating, “to the extent a POSA would understand Black to disclose any scanning, it is certainly not used to create different treatment patterns”).

Patent Owner further contends that Black does not disclose creating any beam patterns using scanners or creating non-overlapping beams. Ex. 2001 ¶ 99. At most, Black discloses a combined beam applied to patient’s skin formed by aligning multiple beams on a combined beam path, and Hsia discloses sequentially applied non-overlapping beams. *Id.* *Neither reference discloses or suggests simultaneously delivering non-overlapping beams. Neither reference discloses or suggests producing beam patterns that include both overlapping and non-overlapping beams.* And neither reference discloses deploying a scanner in any way other than to co-align multiple beams into a single combined beam pattern. *Id.*

PO Resp. 34 (emphasis added).

e) Motivation to Combine

Patent Owner contends that Petitioner’s reasons for combining Hsia and Black “stem only from impermissible hindsight reasoning” and are not supported by the cited evidence. PO Resp. 36–41. For example, Patent Owner contends,

Dr. Milner’s declaration (Ex. 1002) at paragraphs 117–118 cites Hsia paragraphs 3, 6, and 43. But Hsia’s paragraph 3 merely identifies issues with prior art “ablative resurfacing” processes. Ex. 2001 ¶ 105. Hsia’s paragraph 6 discusses the purported advantages of applying a first laser beam to a first region in a first pass, and then a second laser beam to a different, second region in a second pass. Ex. 2001 ¶ 105. And Hsia’s paragraph 43 identifies different wavelengths and penetration depths. Ex. 2001 ¶ 105. None of these paragraphs disclose anything about the purported advantages Dr. Milner identified, let alone in

connection with combining beam patterns, simultaneous beam delivery, or overlapping or nonoverlapping beams. Ex. 2001 ¶ 105.

PO Resp. 37–38. Thus, according to Patent Owner,

of all Dr. Milner’s identified purported advantages in combining Hsia and Black, the *only* identified advantage that is found in the cited portions of the references relates to reducing time—and only in connection with aligning multiple beams along a single beam path to form a single combined beam. Ex. 2001 ¶ 109. Even if a POSA was motivated to combine the teachings, a simple desire to decrease treatment time by using a single combined beam would not lead a POSA to simultaneously apply overlapping and non-overlapping beams. Ex. 2001 ¶ 110.

PO Resp. 40.

3. Petitioner’s Reply

a) Simultaneous beams

Petitioner contends that “even if the Board adopts Patent Owner’s IPR construction of simultaneously application of the patterns, Hsia discloses a simultaneous applied separate scan is an alternative to a sequentially applied second scan.” Reply 10. Petitioner supports its assertion by directing our attention to the following Hsia’s disclosure that the laser source

In FIG. 9, the source 815 can make a separate and/or second scan 905 along to the skin surface 805, to deliver a beam of radiation 830 to the skin to form one or more second thermal injuries 910.

Ex. 1004 ¶ 68 (Petitioner’s emphasis). Petitioner contends that “[t]he use of ‘and/or’ indicates that the second set of thermal injuries can be made by a separate scan alone, a second scan alone, or both a separate and second scan together. Pet. 10.

Petitioner further contends that, “even if Hsia did not individually teach simultaneous application,” a POSA would have understood that Hsia’s two laser beams were capable of being applied simultaneously. *Id.* at 10–11

(Ex. 1002, ¶¶ 104–105; Ex. 2002, 82:17–86:25, 104:15–106:1, 151:13–152:15). Thus, a POSA “would have found it obvious to apply two different wavelength lasers to create combined patterns (as taught by Hsia) that are applied simultaneously to reduce treatment time (as taught by Black).” *Id.* at 11.

b) Fully overlapping beam patterns

Petitioner also contends that “Patent Owner’s argument that Hsia does not disclose overlapping beams is likewise premised on the incorrect belief that Hsia’s beams are not simultaneously applied to skin” (*id.* at 12 (citing PO Resp. 23–24), and further that “at least Figure 4B in Hsia discloses a pattern with fully overlapping beams at the point in which the beams first intersect the surface of tissue being treated” (*id.* at 13).

c) Laser scanners

Petitioner contends that

Despite the clear disclosure of scanning in Black, Patent Owner argues the use of the rotatable optical components in Figure 8 is limited to co-aligning beams and not scanning. PO Resp. 28. However, scanning and co-aligning beams are not mutually exclusive. Indeed, Black’s Figure 8 embodiment teaches the optical elements are used for both directing beams (i.e., scanning) and co-aligning beams. Ex. 1006 at [0058]. Further, both experts agree that Black’s optical elements could distribute beams to areas that are not co-aligned. Ex. 1010 at 131:21-132:7 (Dr. Fried agreeing that Black “would be able to distribute the combined beam at different locations on the skin surface.”); Ex. 2002 at 119:1-12 and 132:15-32 (Dr. Milner testifying “Black allows independent rotation of” optical elements).

Reply 14.

Petitioner further contends

Patent Owner attempts to argue that paragraph [0061] does not apply to Black’s Figure 8 embodiment but only to the Figure 9

embodiment. PO Resp. at 29–30. This argument misses the point since the Petition applies Black’s teachings to Hsia’s system and is not arguing Black’s Figure 8 alone renders the claims obvious. It is beyond dispute that Black’s paragraph [0061] teaches a POSITA that rotatable mirrors can be used as scanners to distribute a laser beam to produce patterns, regardless of how Black used scanners in his own patent. As explained by Dr. Milner, the teachings of a scanner in Black can be combined with the teachings of Hsia to render obvious the claims to a POSITA. Ex. 1002 at ¶¶92-9.

Reply 15.

d) Treatment patterns that include both overlapping and non-overlapping beams

Petitioner fails to directly refute Patent Owner’s contention that “[n]either [Hsia or Black] discloses or suggests simultaneously delivering non-overlapping beams” or that “[n]either [Hsia or Black] reference discloses or suggests producing beam patterns that include both overlapping and non-overlapping beams.” PO Resp. 34; *see* Reply 17 (citing PO Resp. 34).

e) Motivation to combine

Petitioner contends that,

It is not clear what teachings Patent Owner believes are hindsight but Hsia at least teaches benefits of fractional laser treatments ([0003-0005]), improved treatment efficiency, coverage, and healing using two laser beams ([0006]), combination of patterns producing overlapping and non-overlapping beams (Figs. 3A and 3B), simultaneous or sequential application of the two laser beams ([0068]), and how light scattering impacts the depth and magnitude of damage caused by a laser beam in skin tissue ([0041-0043] and [0053]).

In addition, Black teaches at least the benefits of using multiple laser beams over a single laser beam ([0007]), simultaneously applied laser beams significantly decrease

treatment times ([0034]), fully overlapping beams (Fig. 5), rotatable mirrors to re-direct simultaneously applied laser beams [0058], and scanning with rotatable mirrors to produce patterns ([0029-0030] and [0061-0062]).

Reply 18.

4. Patent Owner Sur-reply

Patent Owner replies that the essence of the claimed invention is the “focusing on the integration of multiple beams into complex distribution patterns.” Sur-reply 3 (citing Ex. 1010, 148:11–16 (“[Dr.] Tankovich is talking about the combination of multiple beams to . . . create these complex overlapping and non-overlapping patterns. He is not talking in isolation about 6.2. **He is talking about the overall combined pattern.**”). Patent Owner contends that Petitioner “ignores the patent’s emphasis on the **combination** of multiple patterns,” and instead attempts to simplify the invention as a “simplistic two-spot pattern.” *Id.* (citing Reply at 3).

a) Simultaneous beams

Patent Owner contends that Hsia “exclusively teaches the sequential application of individual radiation beams for creating distinct spatial and temporal treatment areas.” Sur-reply 14. Patent Owner contends that Petitioner’s argument that Hsia’s disclosure of a “separate and/or second scan” supports the concept of simultaneous beams is a new theory and thus improper. *Id.* at 15 (*Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1367 (Fed. Cir. 2015) (affirming the Board’s refusal “to consider

those [new] embodiments because the cited ‘portions of Dhallan were not identified or discussed in the Petition or the accompanying Declarations’).⁸

Patent Owner contends also that, “[e]ven if the Board were to consider this new theory, it finds no support in Hsia’s teachings.” *Id.* at 15–18.

Patent Owner contends that the passage cited by Petitioner references an embodiment illustrated in Figures 8 and 9 of Hsia that is “inherently incapable of applying two separate scans of radiation at the same time.” *Id.* at 17. In particular, Patent Owner contends,

The same paragraph cited by Petitioner describes Figure 8 producing first thermal injuries 835 as “the first pass” and Figure 9, showing additional thermal injuries 910, as “the second pass.” Ex. 1004, [0068]. This distinction further clarifies that the sentence in Figure 9 about the source 815 making a “separate and/or second scan 905” refers to a single laser source 815 delivering two beams to the target tissue in a sequential manner, not simultaneously.

Sur-reply 17.

b) Fully overlapping beam patterns

Patent Owner contends,

Petitioner’s repeated assertions that Hsia discloses overlapping beams that “overlap on the surface of the tissue” demonstrates a fundamental misunderstanding. *See* Reply at 12-13. Dr. Fried’s acknowledgment that Figures 3B and 4B of Hsia show “areas on the surface of the tissue at which the laser beam was incident” merely confirms that these areas were treated by beams **at different times, not simultaneously**. *Id.*; *see also* Ex. 1010 at 87:10-19. Petitioner does not—and cannot—argue that Hsia’s device could be applied to the same treatment area simultaneously. While there may be overlapping projections of injuries on the skin surface in Hsia, the actual radiation beams

⁸ We have considered this argument but agree with Petitioner that support for its argument is found at page 24 of the Petition. Tr. 20:21–24; Pet. 24 (citing Ex. 1004 ¶ 68).

and the resultant thermal injuries do not overlap as they are located at varying depths within the skin (*see, e.g.*, Figure 9) and the radiation beams target the tissue sequentially.

Sur-Reply 19.

c) Laser scanners

Patent Owner contends,

Petitioner's assertion that "rotatable mirrors" are synonymous with scanners (Reply at 14) is fundamentally flawed. This interpretation diverges markedly from the industry's understanding and Black's own characterization of these devices. Notably, Black concedes that its "mirror-based optical delivery device" is not designed for scanning to achieve uniform exposure across extensive surfaces. Ex. 1006 at [0061].

Sur-reply 20 n.5. Patent Owner further contends that "[b]oth experts agree that Black does not disclose any beams that are not coaligned." *Id.* at 21–22 (citing Ex. 2002 at 121:16-122:13; Ex. 1010, 144:20–25; *id.* at 132:8–133:9 (Black's optical system would not work "[i]f one were to separate the beams into multiple beams.")).

d) Motivation to combine

Patent Owner contends that "Petitioner does not meaningfully dispute that Dr. Milner's purposed motions to combine are based on hindsight reasoning." Sur-reply 22. In particular, Patent Owner contends,

Petitioner asserts that these rationales are disclosed in Hsia. But Petitioner's citations to Hsia refer to "ablative resurfacing," the advantages of applying a first laser beam to a first region in a first pass and a second laser beam to a different region in a second pass, and various wavelengths required for different penetration depths. Ex. 1004 at [0003], [0006], [0043]; *see also* Ex. 2001 ¶ 105. None of these paragraphs disclose anything about the purported advantages Dr. Milner identified, let alone in connection with combining beam patterns, simultaneous beam delivery, or overlapping or non-overlapping beams.

Sur-reply 22.

5. Discussion

Having considered the parties’ positions and evidence of record, summarized above, we find Patent Owner to have the better position. In particular, we agree with Patent Owner that the combination of Hsia and Black fail to teach or suggest simultaneously delivering non-overlapping beams. The combination also fails to teach or suggest producing beam patterns that include both overlapping and non-overlapping beams. PO Resp. 34.

To begin, while we recognize that Hsia discloses overlapping and non-overlapping treatment patterns, those patterns are achieved by the sequential delivery of laser beams as a user physically moves a single handpiece that delivers a single beam across the skin of a patient. Ex. 1004 ¶¶ 68, Figs. 8 and 9; Ex. 2001 ¶¶ 73–74.

Black does not cure that deficiency as Black does not disclose treatment with non-overlapping beams. Ex. 2001 ¶ 99. Black discloses using a “refractive optics, mirror-based optical delivery device” for the simultaneous delivery of multiple overlapping laser beams. Ex. 1006 ¶¶ 12–13. The beams align on an optical path and, using different laser beam parameters, deliver treatment at various depths within a combined beam path. *Id.* ¶¶ 54, 58–59. Thus, while Black may be characterized as creating overlapping beams, we do not find sufficient support for a finding that Black teaches or suggests creating non-overlapping beams for simultaneous delivery, and the claims require both. We also do not find sufficient support for Petitioner’s claim that a POSA would have found it obvious to combine Black and Hsia to simultaneously produce both overlapping beams and non-overlapping beams, based on the disclosures in these references. *See, e.g.,*

Ex. 1006 at [0061] (Black’s statement that its “mirror-based optical delivery device” is not designed for scanning to achieve uniform exposure across extensive surfaces).

Rather, when the plain teachings of the references are combined, “Black discloses a combined beam applied to [a] patient’s skin formed by aligning multiple beams on a combined beam path, and Hsia discloses sequentially applied non-overlapping beams.” PO Resp. 34. The combination, however, fails to teach the use of multiple laser beams to create simultaneously delivered non-overlapping laser beams, and, by extension, patterns of overlapping and non-overlapping laser beams. Specifically, nothing in Hsia or otherwise identified by Petitioner would have motivated the skilled artisan to have made the combination or support a POSA’s belief that such a combination would have had a reasonable likelihood of success given the limitations expressed in Black. Ex. 1006 at [0061]; *See* Ex. 2001 ¶ 105.

6. Conclusion

Accordingly, for at least the foregoing reasons, we determine that Petitioner has not established by a preponderance of the evidence that claims 1–28 would have been obvious over the combination of Hsia and Black.

E. Ground 4: Alleged Obviousness of Claims 1–28 over Altshuler and Black

1. Petitioner’s Challenge

Petitioner argues that the teachings of Altshuler and Black in combination render claims 1–28 obvious. Pet. 48–71. Petitioner alleges that Altshuler relates to a photocosmetic device using two radiation sources with separate optical systems for use on a patient’s skin. Pet. 15 (citing Ex. 1005 ¶¶ 5, 76, 84, 85, Figs. 2A, 2B, 3; Ex. 1002 ¶ 63). Petitioner alleges Altshuler

discloses that the radiation sources may produce parallel or overlapping radiation, and that the optical system may be configured to produce an overlap of at least one part of the two radiation beams. *Id.* at 15–16 (citing Ex. 1005 ¶ 85; Ex. 1002 ¶ 275). Petitioner further alleges Altshuler discloses that the two optical systems can produce separate areas of radiation or patterns of radiation. *Id.* at 16 (citing Ex. 1005 ¶¶ 86, 87, 173; Ex. 1002 ¶¶ 65, 275). Petitioner alleges that Altshuler discloses two pivoting transmission systems that pivot in at least one rotational direction. *Id.* at 49 (citing Ex. 1005 ¶¶ 174, 175; Ex. 1002 ¶ 269).

Petitioner asserts that the ordinarily skilled artisan would have understood that each laser beam disclosed in Altshuler would form its own pattern from the optical system and that the disclosed pivoting transmission systems act as scanners to direct the location of the beams, thereby meeting the preamble, limitations (a) and (b) of claim 1 and the first half of limitation (a) of claim 11. *Id.* at 48–50 (citing Ex. 1005 ¶¶ 5, 53, 54, 61, 62, 76, 84, 85, 87, 173–175; Ex. 1002 ¶¶ 262, 265, 269). Petitioner alleges that the artisan would have known from Black how to control and program multiple scanners and could have implemented those teachings in other laser systems to add adjustability without undue experimentation. *Id.* at 50 (citing Ex. 1006 ¶ 62; Ex. 1002 ¶¶ 268, 272). Petitioner alleges the artisan would have found it obvious to “combine and scan multiple beams into a desired pattern, such as overlapping and non-overlapping,” thereby meeting limitation (c) of claim 1 and the second half of limitation (a) of claim 11. *Id.* (citing Ex. 1006 ¶ 62; Ex. 1002 ¶ 273).

Petitioner alleges that Altshuler teaches both overlapping and non-overlapping beams. *Id.* at 51–52 (citing Ex. 1005 ¶ 85, Figure 2B; Ex. 1002 ¶ 283). Petitioner argues that the artisan would have turned to Black’s

teachings to incorporate adjustable scanners for use with multiple lasers to allow treatment using multiple patterns and at different tissue depths. *Id.* at 52–53 (citing Ex. 1005 ¶¶ 54, 61, 62 Figure 5; Ex. 1002 ¶¶ 284, 286–288).

Petitioner alleges that

Black teaches the adjustability and the programmability of the scanners, which would allow a POSA to apply two beams simultaneously but in a non-overlapping pattern, an overlapping pattern, or a combination thereof. Ex. 1006 at [0061]-[0062]; Ex. 1002 ¶286. Therefore, a POSA would have understood that obvious adjustments to the locations of the beams would result in overlapping and non-overlapping beams. Ex. 1002 ¶287. A POSA would have further understood that the beam patterns would be adjustable to overlap and/or not overlap at the skin surface, below the skin surface, or both. Ex. 1002 ¶287.

Pet. 53. Petitioner alleges the claimed subject matter is an unsurprising combination of known elements providing predictable results to the ordinarily skilled artisan. *Id.*

Petitioner alleges the ordinarily skilled artisan would have been motivated to make the combination to improve safety, decrease treatment times while treating multiple areas with reduced injuries, modify light scattering for desired therapeutic effects, and to develop a device to use to obtain such benefits. *Id.* at 54–55 (citing Ex. 1005 ¶ 3; Ex. 1006 ¶¶ 7, 34; Ex. 1002 ¶¶ 290–292). Petitioner alleges that the artisan would have found it obvious to combine the teachings of Black with Altshuler to make either sequential or simultaneous overlapping and non-overlapping beam patterns, and would have had a reasonable expectation of success in doing so. *Id.* at 55 (citing Ex. 1002 ¶¶ 292, 293).

With regard to claim 11, Petitioner incorporates its allegations regarding the teachings of claim 1. Pet. 60–63. Petitioner also alleges that the combination of Altshuler and Black specifically teach medical treatment

of biological tissue including skin conditions, thereby meeting limitation (b) of claim 11. *Id.* at 60–63 (citing Ex. 1005 ¶¶ 2, 185, 190, 192, 195, 204, 206–208; Ex. 1006 ¶ 12; Ex. 1002 ¶¶ 342, 357, 358). Petitioner also reiterates its allegations regarding the proposed combination of teachings of Altshuler and Black regarding using multiple laser beams to create overlapping and non-overlapping beam patterns. *Id.* at 61–62 (citing same citations). Petitioner alleges that the ordinarily skilled artisan would have understood that the combined laser beams could be used to treat a single tissue condition, and would have been motivated to combine the teachings of Altshuler and Black “for, e.g., improved safety, desired treatment outcomes, and shorter treatment times, with a reasonable expectation of success,” rendering claim 11 obvious. *Id.* at 63 (citing Ex. 1002 ¶¶ 361, 362).

The dependent claims in this ground recite specific laser wavelengths, laser types and settings, and treatment parameters and strategies. Ex. 1001, 1048–11:9; 11:18–12:38. Petitioner cites specific teachings in Altshuler and Black that teach each limitation of the dependent claims (*id.* at 55–60, 64–72) with declarant support that each limitation would have been perceived as taught by an ordinarily skilled artisan. (Ex. 1002 ¶¶ 297–339, 365–437).

2. Patent Owner’s Response

As noted by Patent Owner, “Petitioner asserts a POSA would have been motivated to combine Black with Altshuler by repeating—often verbatim—the same arguments it raised as to why a POSA would have combined Black with Hsia.” PO Resp. 48; *compare* Pet. 26–31 with *id.* at 52–55. As we have addressed above the majority of the parties’ arguments in our discussion of Ground 1, we confine our analysis here to Patent Owner’s arguments specific to dispositive issues concerning Petitioner’s proposed combination of Altshuler and Black.

Patent Owner contends that, “[l]ike Hsia, Altshuler does not disclose simultaneously delivering fully overlapping and non-overlapping beams as required by the challenged claims.” PO Resp. 45 (citing Ex. 2001 ¶ 119). Patent Owner further contends that Petitioner fails to explain “why a POSA would understand that [Altshuler’s] pivoting transmission systems could be used to produce the beam distribution patterns required by the claims.” *Id.* at 47 (citing Ex. 2001 ¶¶ 121–122). Rather, Patent Owner argues that

a POSA would understand the pivoting transmission systems are not designed to produce different beam patterns but rather to ensure that the treatment heads can maintain close contact with curved areas of skin to ensure that the treatment heads deliver radiation in the particular intended pattern (*e.g.*, a pattern of parallel nonoverlapping beams). Ex. 2001 ¶ 123. Moreover, Altshuler expressly confirms that the purpose of these pivoting transmission systems is “to facilitate maintenance of contact with a curved area of a skin,” and there is no mention of them being used to distribute beams in different patterns. *See* Ex. 1005 at ¶¶ 174-175; Ex. 2001 ¶ 123. Indeed, when these pivoting transmission systems maintain close contact with skin as they were intended to facilitate, it would not be possible for them to create anything other than the intended and particular pattern of radiation on the skin. Ex. 2001 ¶ 124. As Dr. Fried explains, this design would effectively lock or constrain distribution pattern to a specific configuration that is controlled by a patient’s skin curvature and not a design that would be designed to work in connection with scanning systems. *Id.*

PO Resp. 47–48. Patent Owner further contends that “Ppetitioner and its expert never even describe what a system that combines the teachings of Altshuler or Black that could distribute the pattern of beams required by the claims would look like.” *Id.* at 49.

3. *Petitioner’s Reply*

Petitioner contends that Altshuler’s dual laser system operates without scanners to produce patterns of overlapping and non-overlapping beams.

Reply 19–20. Petitioner contends that the addition of Black’s scanners to distribute the laser beams would achieve the patterns of overlapping and non-overlapping beams recited by the challenged claims. Specifically, Petitioner contends that “it was obvious to distribute Altshuler’s laser beams to additional areas by rotating a scanner, such as the mirrors taught by Black.” *Id.* at 21 (citing Ex. 1002 ¶¶ 286–287; Ex. 2002, 173:14–175:12 (“if there was a tilt or something, it -- it would change the pattern on the skin.”), 181:19–182:7). Petitioner further contends that,

While Altshuler does not expressly mention using a scanner, Altshuler is agnostic as to the optical components used in his optical systems to deliver the laser beams to the tissue. Ex. 1005 at [0074] (defining optical system broadly) and [0123] (optical system includes component to transmit light to the skin). Thus, it would be obvious to a POSITA that the optical systems could include scanners. Ex. 1002 at ¶¶ 286–287; Ex. 2002 at 186:23–187:6.

Reply 22.

4. Patent Owner’s Sur-reply

Patent Owner contends that, even assuming a POSA would have been motivated to apply Black’s scanners to Altshuler’s dual laser system, “the resultant system would still be limited to producing only one combined pattern at a time.” Sur-reply 23–24. That is, Petitioner’s combination results in a system that either simultaneously applies two beams to non-overlapping areas of tissue or simultaneously applies two beams to overlapping areas. *Id.* at 24. Patent Owner contends that “[s]uch a configuration is incapable of producing overlapping and non-overlapping beams *simultaneously* as required by the ’481 Patent claims.” *Id.*

5. *Discussion*

Having considered the parties' positions and evidence of record, summarized above, we find Patent Owner to have the better position. As discussed above, we agree with Patent Owner that the claims are properly construed to be directed to laser systems and methods of use thereof requiring the simultaneous delivery of laser beams to produce overlapping and non-overlapping beam patterns. *See supra*, Section II.C.1; PO Resp. 12–15. In its Petition, Petitioner directs our attention to Figure 2 of Altshuler to argue that Altshuler explicitly teaches a plurality of parallel beams that form a non-overlapping pattern. Pet. 51. We note, however, that Petitioner does not sufficiently explain whether Altshuler's system is producing a non-overlapping laser beam pattern or a non-overlapping treatment pattern, where a non-overlapping laser beam pattern requires simultaneous delivery of laser beams and where a non-overlapping treatment pattern may be achieved with both the simultaneous and sequential delivery of laser energy.

Petitioner then directs our attention to Black's system of co-aligning multiple beams to form an overlapping beam pattern and contends that "a POSA would have looked to Black to provide adjustability of scanners with multiple lasers." *Id.* at 52. Petitioner contends that

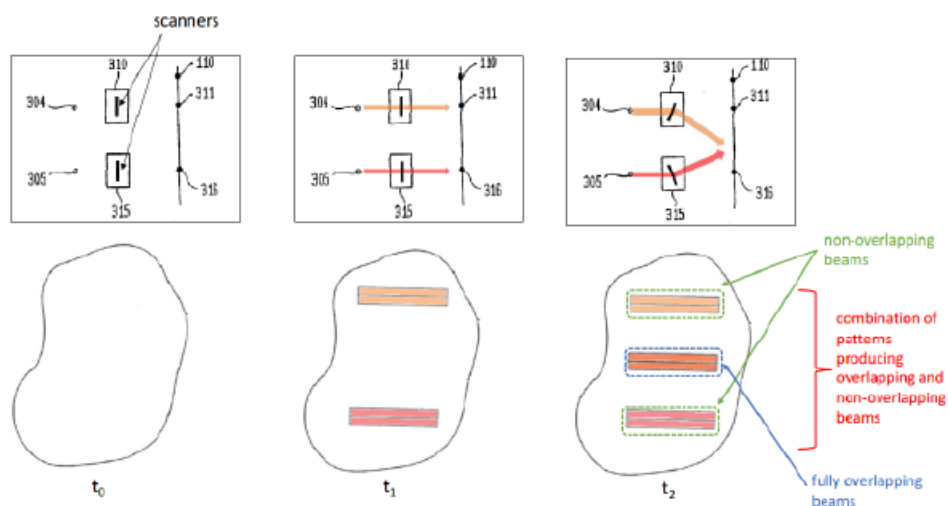
A POSA would understand from Black that the simultaneous application of two beams could also be applied in a non-overlapping pattern. Ex. 1002 ¶285 Specifically, Black teaches the adjustability and the programmability of the scanners, which would allow a POSA to apply two beams simultaneously but in a non-overlapping pattern, an overlapping pattern, or a combination thereof. Ex. 1006 at [0061]-[0062]; Ex. 1002 ¶286. Therefore, a POSA would have understood that obvious adjustments to the locations of the beams would result in overlapping and non-overlapping beams. Ex. 1002 ¶287. A

POSA would have further understood that the beam patterns would be adjustable to overlap and/or not overlap at the skin surface, below the skin surface, or both. Ex. 1002 ¶¶287.

Pet. 52–53. Petitioner supports its contention with the testimony of Dr. Milner that is nearly verbatim to the Petition. Ex. 1002 ¶¶ 285–287.

We have considered Petitioner’s proposed combination as articulated in the Petition (Pet. 51–55), but determine that Petitioner fails to sufficiently explain how the combination of Altshuler and Black would achieve a system capable of producing multiple laser beams simultaneously that result in overlapping and non-overlapping laser patterns. Rather, we agree with Patent Owner’s analysis, which we adopt as our own, that, even assuming a POSA would have been motivated to apply Black’s scanners to Altshuler’s dual laser system, “the resultant system would still be limited to producing only one combined pattern at a time.” *See* Sur-reply 23–24. Specifically, Patent Owner reproduces the following illustration from Petitioner’s Reply, which Petitioner argued “created patterns by distributing the beam into a discrete ‘number of distribution spots.’”

:



Id. (citing Reply 21, quoting Ex. 1001 at 4:53–5:12). With reference to the figure above, Patent Owner explains that “at time t_0 no lasers are distributed, at time t_1 , both laser beams are simultaneously applied to **non-overlapping areas of tissue**, . . . and at [a different, later] time t_2 the scanners rotate so that the two beams are simultaneously applied to **fully overlapping areas**[.]” *Id.* (quoting Reply at 21–22). Such a configuration fails to produce simultaneous overlapping and non-overlapping beams. The record lacks sufficient evidence to the contrary. Thus, for at least that reason, we determine that Petitioner has failed to establish by a preponderance of evidence that the combination of Altshuler and Black would achieve a laser system capable of simultaneously administering two or more beams in overlapping and non-overlapping beam patterns.

6. Conclusion

Accordingly, we determine that Petitioner has not established by a preponderance of the evidence that claims 1–28 would have been obvious over the combination of Altshuler and Black.

F. Remaining Grounds

Petitioner contends that claim 23 would have been obvious over Hsia McCowan, Black, and Negus (Ground 2) and that claims 27 and 28 would have been obvious over Hsia, Black, and Altshuler (Ground 3). As claims 23, 27, and 28 depend from independent claim 11, these proposed grounds of unpatentability rely on the combination of Hsia and Black rendering unpatentable claim 11. As discussed above, Petitioner has not shown that claim 11 would have been obvious over the combination of Hsia and Black. Accordingly, for the same reasons discussed above, Petitioner has not shown

that claims 23, 27, and 28 would have been obvious under Petitioner's Grounds 2 and 3.

Petitioner additionally contends that claim 23 would have been obvious over Altshuler, Black, and Negus (Ground 5). As claim 23 depends from independent claim 11, this proposed ground of unpatentability relies on the combination of Altshuler and Black rendering unpatentable claim 11. As discussed above, Petitioner has not shown that claim 11 would have been obvious over the combination of Altshuler and Black. Accordingly, for the same reasons discussed above, Petitioner has not shown that claim 23 would have been obvious over the combination of Altshuler, Black, and Negus.

III. CONCLUSION

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–28	103	Hsia, Black		1–28
23	103	Hsia, Black, Negus		23
27, 28	103	Hsia, Black, Altshuler		27, 28
1–28	103	Altshuler, Black		1–28
23	103	Altshuler, Black, Negus		23
Overall Outcome				1–28

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has not shown by a preponderance of the evidence that claims 1–28 of the '481 patent are unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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