

McGraw-Hill
Dictionary of
SCIENTIFIC
and
TECHNICAL
TERMS



Sixth Edition

On the cover: Representation of a fullerene molecule with a noble gas atom trapped inside. At the Permian-Triassic sedimentary boundary the noble gases helium and argon have been found trapped inside fullerenes. They exhibit isotope ratios quite similar to those found in meteorites, suggesting that a fireball meteorite or asteroid exploded when it hit the Earth, causing major changes in the environment. (Image copyright © Dr. Luann Becker. Reproduced with permission.)

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**McGraw-Hill Dictionary of Scientific and Technical Terms,
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when one is ferromagnetic and one is antiferromagnetic. {iks'chānj, an'ə'sā-trə-pē}

exchange broadening [SPECT] The broadening of a spectral line by some type of chemical or spin exchange process which limits the lifetime of the absorbing or emitting species and produces the broadening via the Heisenberg uncertainty principle. {iks'chānj 'brəd-ən-iŋ}

exchange buffering [COMPUT SCI] An input/output buffering technique that avoids the internal moving of data. {iks'chānj, bəf-ə-rɪŋ}

exchange cable [ELEC] Lead covered, nonquadded, paper-insulated cable used within a given area to provide cable pairs between local subscribers and a central office. {iks'chānj, kɑ-bəl}

exchange capacity [GEOL] The ability of a soil material to participate in ion exchange as measured by the quantity of exchangeable ions in a given unit of the material. {iks'chānj kə,pas-əd-ē}

exchange coefficient [FL MECH] A coefficient of eddy flux in turbulent flow, defined in analogy to those coefficients of the kinetic theory of gases. Also known as austausch coefficient; eddy coefficient; interchange coefficient. {iks'chānj, kō-i, fish-ənt}

exchange current [ELEC] The magnitude of the current which flows through a galvanic cell when it is operating in a reversible manner. {iks'chānj, kə-rənt}

exchange degeneracy [PART PHYS] Coincidence of two Regge trajectories for particles having the same quantum numbers (except for parity, charge parity, and G parity) where one would have expected separate trajectories for alternate Regge recurrences. [QUANT MECH] An exchange process that leads back to the original configuration. Also known as exchange symmetry. {iks'chānj dē'jen-ə-rə-sē}

exchange force [QUANT MECH] The force arising in an exchange interaction. {iks'chānj, fɔrs}

exchange integral [QUANT MECH] Integral over the coordinates of two identical particles which can be thought of as the interaction between a given state and a second state in which the coordinates of the particles are exchanged. {iks'chānj 'in-tə-grəl}

exchange interaction [QUANT MECH] 1. An interaction represented by a potential involving exchange of space or spin coordinates, or both, of the particles involved; can be visualized physically in terms of exchange of particles. 2. Any interaction which can be looked upon as due to exchange of particles. {iks'chānj, int-ə'ra-k-shən}

exchange line [ELEC] Line joining a subscriber or switchboard to a commercial exchange. {iks'chānj, lɪn}

exchange message [COMPUT SCI] A device, placed between a communication line and a computer, in order to take care of certain communication functions and thereby free the computer for other work. {iks'chānj, mes-ij}

exchange narrowing [SPECT] The phenomenon in which, when a spectral line is split and thereby broadened by some variable perturbation, the broadening may be narrowed by a dynamic process that exchanges different values of the perturbation. {iks'chānj 'nar-ə-wɪŋ}

exchange operator [QUANT MECH] An operator which exchanges the spatial coordinates of the particles in a wave function, or their spins, or both positions and spins. {iks'chānj, əp-ə-rād-ər}

exchange plant [COMMUN] Plant used to serve subscriber's local needs as distinguished from that used for long-distance communication. {iks'chānj, plant}

exchanger See heat exchanger. {iks'chānj-ər}

exchange reaction [CHEM] Reaction in which two atoms or ions exchange places either in two different molecules or in the same molecule. {iks'chānj rē,ak-shən}

exchange-repulsion [PHYS CHEM] A force that arises between neighboring molecules when they are close enough that their electron clouds overlap and, as a consequence of the Pauli exclusion principle, electrons are squeezed out from the region between the nuclei, which then repel each other. {iks'chānj ri,pəl-shən}

exchange sort [COMPUT SCI] A method of arranging records or other types of data into a specified order, in which adjacent pairs of records are exchanged until the correct order is achieved. {iks'chānj, sɔrt}

exchange symmetry See exchange degeneracy. {iks'chānj 'sim-ə-trē}

exchange transfusion [MED] The replacement of most or all of the recipient's blood in small amounts at a time by blood from a donor, a technique used particularly in cases of erythroblastosis fetalis, in certain types of poisoning such as salicylism, and occasionally in liver failure. Also known as replacement transfusion. {iks'chānj tranz,fyū-zhən}

exchange velocity [CHEM] In an ion-exchange process, the speed with which one ion is displaced from an exchanger in favor of another ion. {iks'chānj və'lās-əd-ē}

excimer [CHEM] An excited diatomic molecule where both atoms are of the same species and are dissociated in the ground state. {ek'sə-mər}

excimer laser [OPTICS] A laser containing a noble gas, such as helium or neon, which is based on a transition between an excited state in which a metastable bond exists between two gas atoms and a rapidly dissociating ground state. {ek'sə-mər, lā-zər}

excipient [PHARM] Any inert substance combined with an active drug for preparing an agreeable or convenient dosage form. {ek'sip-ē-ənt}

exciplex [CHEM] An excited electron donor-acceptor complex which is dissociated in the ground state. {ek'sə,pleks}

Excipulaceae [MYCOL] The equivalent name for Discellaceae. {ek'sə-pə'lās-ē,ē}

excircle See escribed circle. {ek'sər-kəl}

excision [GEN] Recombination involving removal of a genetic element. [MED] The cutting out of a part; removal of a foreign body or growth from a part, organ, or tissue. {ek'sizh-ən}

excision enzyme [BIOCHEM] A bacterial enzyme that removes damaged dimers from the deoxyribonucleic acid molecule of a bacterial cell following light or ultraviolet radiation or nitrogen mustard damage. {ek'sizh-ən 'en,zīm}

excitable [BIOL] Referring to a tissue or organism that exhibits irritability. {ek'sid-ə-bəl}

excitation [ATOM PHYS] A process in which an atom or molecule gains energy from electromagnetic radiation or by collision, raising it to an excited state. [CONT SYS] The application of energy to one portion of a system or apparatus in a manner that enables another portion to carry out a specialized function; a generalization of the electricity and electronics definitions. [ELEC] The application of voltage to field coils to produce a magnetic field, as required for the operation of an excited-field loudspeaker or a generator. [ELECTR] 1. The signal voltage that is applied to the control electrode of an electron tube. Also known as drive. 2. Application of signal power to a transmitting antenna. [NEUROSCI] A change in the electrical state of a neuron leading to an action potential. [QUANT MECH] The addition of energy to a particle or system of particles at ground state to produce an excited state. {ek,sɪ'tā-shən}

excitation anode [ELECTR] An anode used to maintain a cathode spot on a pool cathode of a gas tube when output current is zero. {ek,sɪ'tā-shən, an,əd}

excitation curve [NUC PHYS] A curve showing the relative yield of a specified nuclear reaction as a function of the energy of the incident particles or photons. Also known as excitation function. {ek,sɪ'tā-shən, kərv}

excitation energy [QUANT MECH] The minimum energy required to change a system from its ground state to a particular excited state. {ek,sɪ'tā-shən, en-ər-jē}

excitation function [ATOM PHYS] The cross section for an incident electron to excite an atom to a particular excited state expressed as a function of the electron energy. See excitation curve. {ek,sɪ'tā-shən, fəŋk-shən}

excitation index [SPECT] In emission spectroscopy, the ratio of intensities of a pair of extremely nonhomologous spectral lines; used to provide a sensitive indication of variation in excitation conditions. {ek,sɪ'tā-shən, in,deks}

excitation loss See core loss. {ek,sɪ'tā-shən, lɔs}

excitation potential [QUANT MECH] Electric potential which gives the excitation energy when multiplied by the magnitude of the electron charge. {ek,sɪ'tā-shən pə'ten-ʃəl}

excitation purity [ANALY CHEM] The ratio of the departure of the chromaticity of a specified color to that of the reference source, measured on a chromaticity diagram; used as a guide of the wavelength of spectrum color needed to be mixed with

EXCITATION

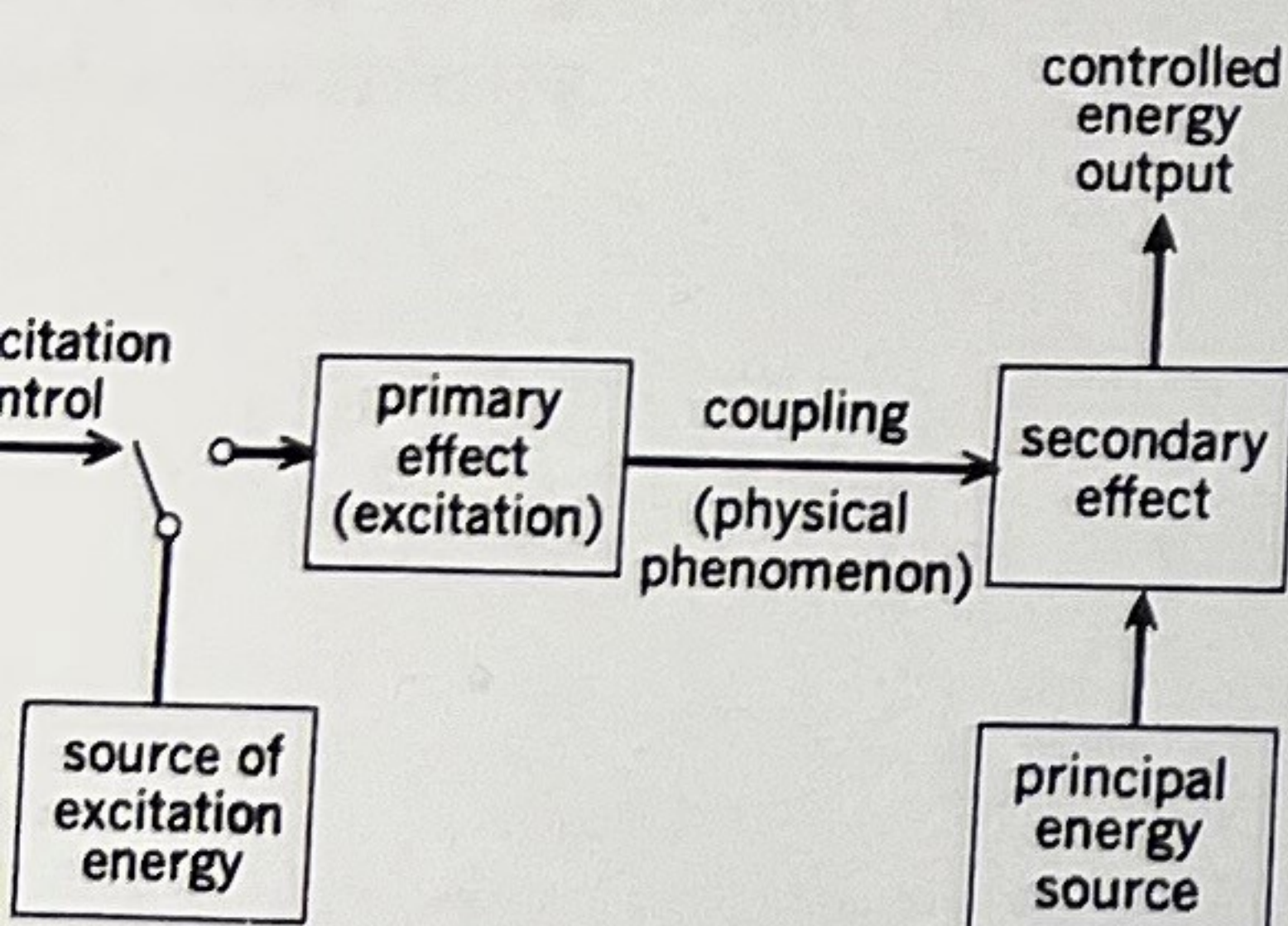


Diagram showing function of excitation in a control system.