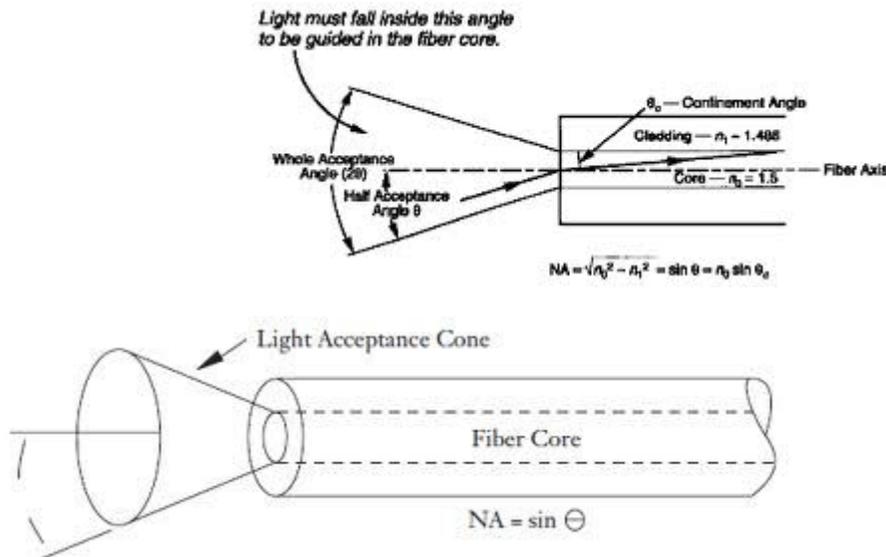


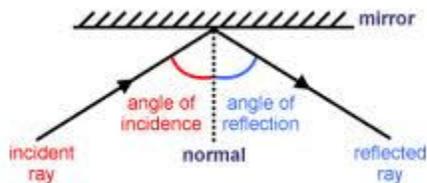
Absorption: in an OF, the loss of Optical power, resulting from conversion of that power into heat.

Scattering: The changes in direction of light confined within an OF, occurring due to imperfection in the core & cladding, Scattering causes no changes in the wavelength of the radiation.

Acceptance Angle: The angle within which the OF will accept light for transmission along its core. This angle is measured from the centre of the core.



Angle of incidence: The angle form between a ray of light striking a surface & a line drawn perpendicular to that surface at a point of incidence(the point at which the light ray strikes the surface)

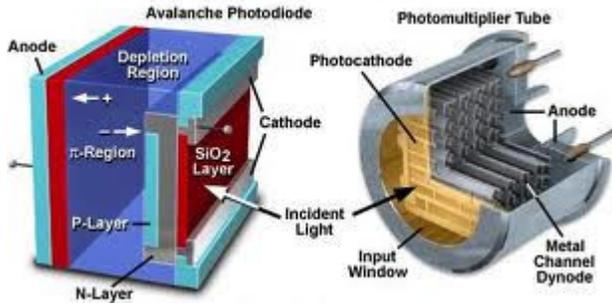


Angstrom (A*o): A unit of length often used to characterize light. An Angstrom is equal to 0.1nM or 10*(-10)M.(Special symbol)

Attenuation: Loss of optical Power.

Attenuation coefficient: The rate of diminishing Optical Power- the sum of scattering & absorption coefficients.

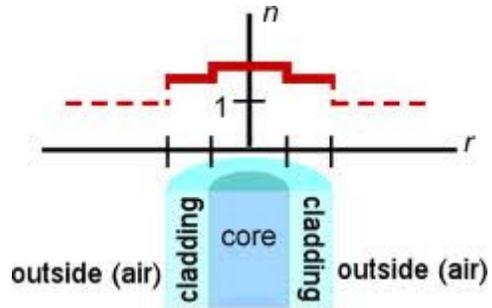
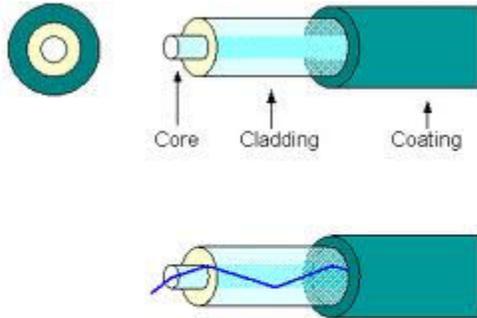
Avalanche Photo Diodes: A semiconductor photo detector that includes detection and amplification. Electron and hole pairs generated between p and n junctions are accelerated in a high electronic field region. They collide with ions to create other electron hole pairs, current amplification. APD's can detect faint signals, but at higher operating voltages than other semiconductor photodetector.



Back scattering: The portion of scattered light which a direction generally opposite to the propagation.

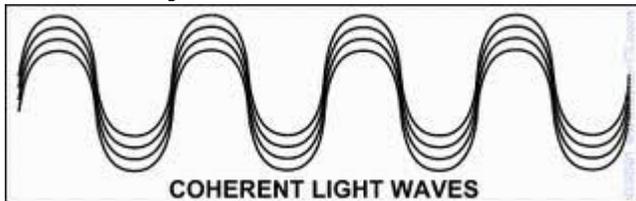
Cable: A single fibre or bundle, sometimes including strengthening strands of opaque material covered by a protective jacket.

Cladding: A layer of glass or other transparent material surrounding the light carrying core of an OF. It has a lower refractive index than the core. Coatings may be applied over the cladding.

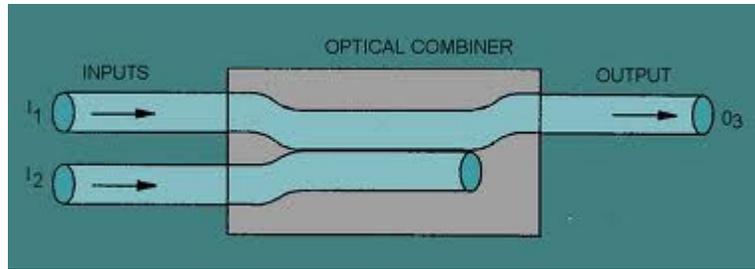


The Optical Fiber carries the light in its core, whose Refractive Index is greater than that of the cladding

Coherent: Light, as in a laser beam, whose waves has been identical frequencies and are in phase with each other. Only laser produce coherent light.



Combiner: a passive device in which Optical power from several input fibres is collected at a common point in a single fibre.



Coupler: A device which connects 3 or more fibre ends, dividing 1 input among 2 or more outputs or combining 2 or more inputs into 1 output.

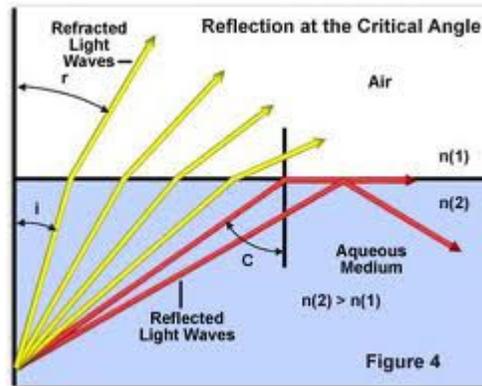


Connector: A device mounted at the end of a fibre cable, light source, receiver or housing that mates to a similar device to couple light optically into and output of optical fibres. A connector joints 2 fibre ends or one fibre end and light source & a detector.



Core: The central portion of OF that carries light.

Critical Angle: The smallest angle of incidence at which light will undergo total internal reflection.



Cutback technique: A technique for measuring fibre attenuation or distortion by performing 2 transmission measurements. 1 measurement is taken at the full length of the fibre; the other when a portion has been cut from the full length.

Dark current: a parasitic output current that a photo detector produces in the absence of light & operational voltages.

Decibel: A logarithmic unit of measure used to express gain or loss and relative power levels. Ten times the base 10 of that logarithm ratio;
 $dB = 10 \times \log(P2/P1)$

Detector: A device that generates an electrical signal when illuminated by light or infra red radiation. The most common detectors in FO are APD's, photo diodes, photo-darlington and photo transistors.

Discrete: referring to an individual component that is complete in itself. Examples of such are resistors, printed circuit boards, transistors & LED's.

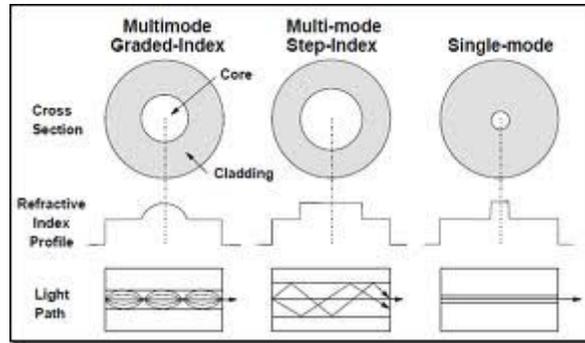
Dispersion: Distortion of an electromagnetic signal caused by the varying propagation characteristics (speed) of different wavelengths. In OF the optical pulse is spread out.

Distortion: change in a signal waveform. This include distortion & clipping in amplifier circuit.

Endoscope: a medical optical fibre bundle used to examine the inside of the human body.

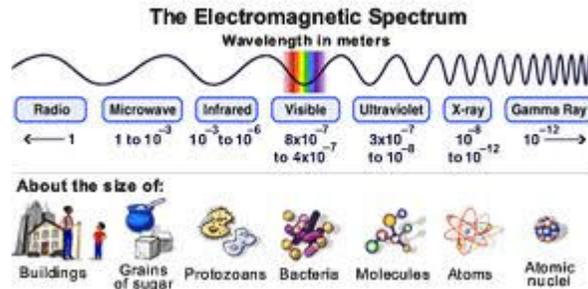
Fall time: typically specified as the time required for a signal to fall from 90% to 10% of its original - or + amplitude. The opposite is the rise time.

Graded index fibre: an OF which has a refractive index changes from centre to the edge. These fibre will have much less dispersion than Step index fibre.



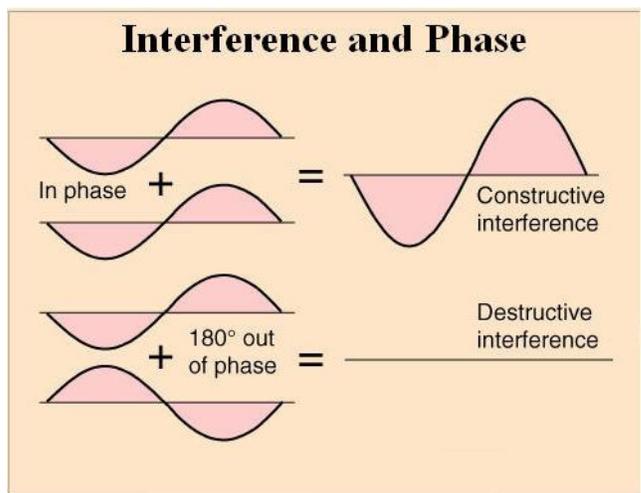
In coherent light: light that is made up of rays with lack of fixed phase relationship. Most light is in coherent. LEDs provide this type of radiation.

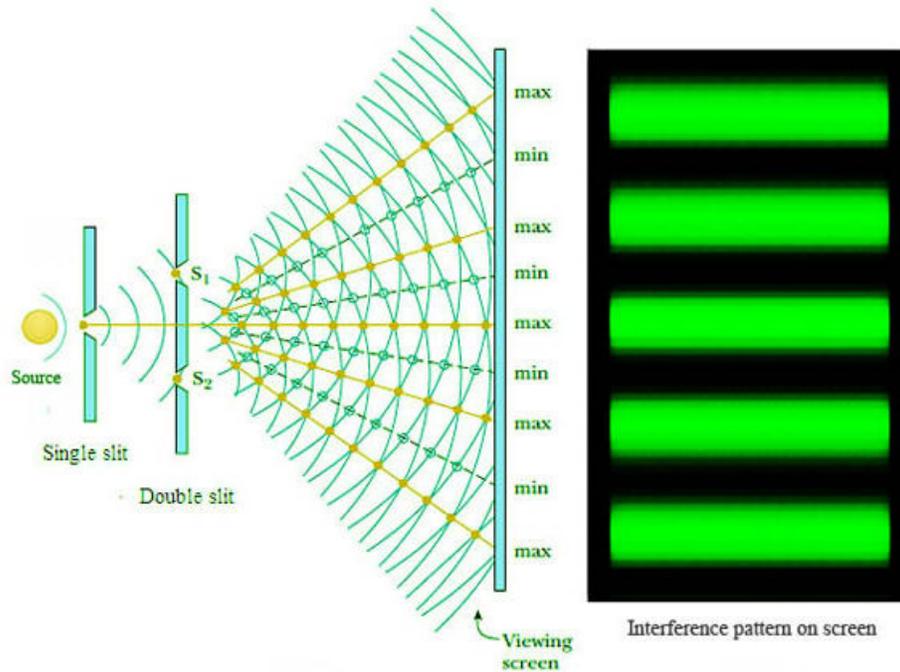
Infrared: wavelengths longer than 700 nm & shorter than ... Mm. This radiation cannot be seen but can be felt.



Insertion loss: the OP loss caused by insertion of an optical component such as a connector, splice or a coupler into previously continuous light path.

Interference: 1. The additive process whereby the amplitude of the 2 or more waves are systematically attenuated & reinforced. 2. The process where a given wave is split into 2 or more waves by, for ex, reflection or re fraction of beam splitters, & then reunited to form a single wave



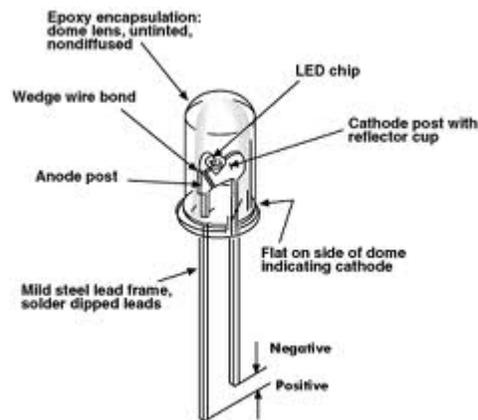


Intrinsic joint loss: loss caused by fibre- parameters(eg. Core dimensions, profile parameters) mismatched when 2 non identical fibres are joined.

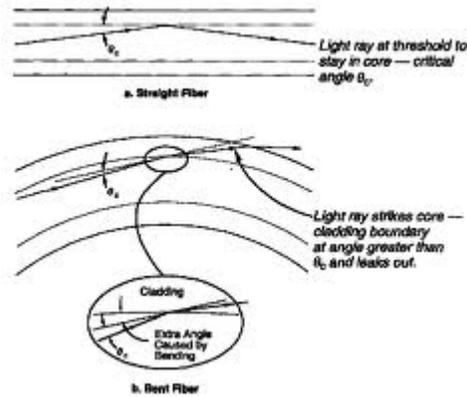
Laser: 1. An acronym for " Light Amplification by Stimulated Emission of Radiation. Laser light is highly directional, occupied a very narrow band of wavelengths and is more coherent than ordinary light.2. "Laser" also refers to the apparatus which create laser light.

Light: 1. Electromagnetic radiation visible to human eye 2. Commonly, the term is applied to electromagnetic radiation with properties similar to those visible light, including the invisible near- infrared radiation used in OF systems.

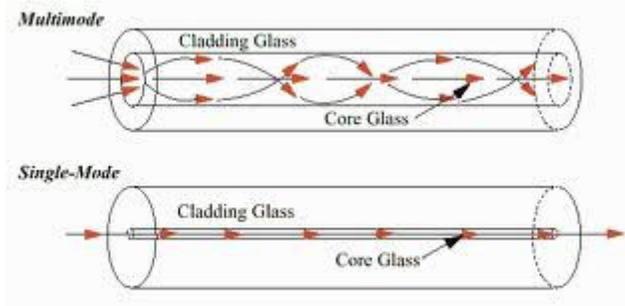
LED: light emitting diodes: A p-n junction semiconductor device that emits in coherent optical radiation when biased in the forward directions.



Micro bending Losses: light losses caused by sharp curvature involving local axial displacement of a few micro meters & a special wavelength of a few mm. Such bends may result from fibre coating, cabling, packaging & installation. Micro bending can cause serious radiation losses & mode coupling.



Mode: in any cavity of transmission, one of the electromagnetic field distributions that satisfies the Maxwell equations & boundary conditions. The field pattern of the mode depends on the wave length, refractive index and cavity or wave guide geometry.



Mode coupling: an OF the exchange of power among modes. The exchange will reach statistical equilibrium after propagation over a finite distance that is designated by the equilibrium length.

Modulate: To modify the single- frequency carrier frequency with a super imposed signal containing information. Ex: amplitude/frequency/phase/ pulse - Modulations. Used whether the carrier is a Light frequency signal or a radio frequency signal.

Multi Mode fibres: A fibre that permits propagation of more than 1 mode. The number of Modes in the fibre is defined by the boundary conditions & maxwell equations. The core diameter of Multi mode fibres can range from 25 - 2000 microns. (1 micron= 10×10^{-6} M)

Near infrared: The shortest wave length in the infra red region(700 - 2000 nm), just slightly longer than those of visible light.

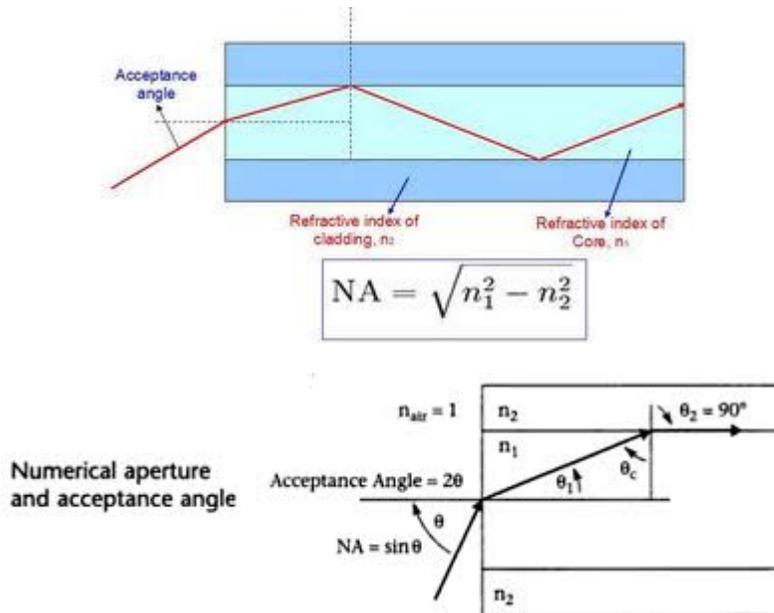
Noise currents: Any noise voltage or current that prevent precise measurements. Dark current & thermal noise (from amplifiers &

resistors) contributes the noise in fibre optic systems.

Noise equivalent Power: the rms value of OF which is required to produce an rms signal to noise ratio of 1/1. NEP is an indication of noise level which defines the minimum detectable signal level

Numerical Aperture:

The NA of an OF defines the characteristics of the fibre in terms of its accepting of impinging light. The larger the numerical aperture the greater the ability of a fibre to accept light.



Optical spectrum

A portion of electromagnetic spectrum within the wave length region extending from the ultra violet at 20 nm to the infra red at 100 microm

Optical Time Domain reflectometer:(OTDR) a method for characterising a fibre whereby an optical pulse is transmitted thru' the fibre & the resulting back scatter & reflections are measured as a function of time. Useful in estimating attenuation coefficient as a function of distance & identifying defects & other localised losses.

Plastic clad silica (PCS) fibre: a fibre with glass core & plastic cladding. This fibre has very high NA & high light transmission.

Pulse dispersion: The widening of an optical pulse as in the length of the fibre. This property which limits the use of bandwidth of the fibre- is usually expressed in nsec widening per KM. The principal mechanism are material dispersion & multi mode distortion effects.

Quantum Efficiency: the conversion of Photons/sec to Electrons/sec for detectors & vice versa for light source.

Rayleigh scattering: scattering by refractive index fluctuations(in homogeneous in material density or composition) that are small with

respect to wave length. The scattered field is inversely proportional to the 4th power of the wavelength.

Refractive Index: the ratio of light in a vacuum to the speed of the light in a material.

Refractive Index profile: the description of refractive index as a function of radius in the fibre.

Responsivity: The ratio of detector out put to input. (Micro amp/ micro watt)

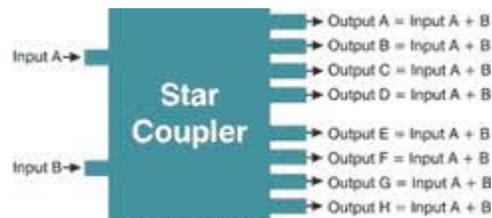
Single Mode Fibre:

A fibre thru' which the light can travel one path. This fibre is having very small core diameter less than 10 Micons.

Splice: A permanent junction between optical fibres. Splices may be thermal fused or mechanically applied.

Spontaneous Emission: Radiation emitted when an internal energy of a quantum mechanical system in an Atom drops from an excited level to a lower level without regard to the spontaneous presence of similar radiation. Ex includes 1) radiation from an LED2) radiation from sun.

Star couplers: A passive devise in which the power from one or more input OF's is distributed among a larger number of output fibres.



Step Index fibres: A fibre in which the core has a uniform refractive index profile which abruptly changes at the boundary between Core & Cladding.

Stimulated Emission: Radiation emitted when the internal energy of a quantum mechanical system drops from an excited level to a lower level when induced by the presence of radiant energy at the same frequency. Ex;an injection of laser diodes below lasing the Threshold.(A solid state semiconductor device consisting of at least 1 pn junction. Capable of emitting coherent, stimulated radiation under specified conditions)

Transmittance: The ratio of the radiant power transmitted from an object to the incident radiant power. Ex; sun glass may transmit to your eyes only 10% of the light being radiated from sun.

Ultraviolet: An invisible portion of the optical spectrum whose wavelengths begin immediately beyond the violet end of the visible spectrum. Ultraviolet wave lengths range from 20 to 380 nm. These are the most damaging of the sun's rays to human skin & eyes.

Velocity of Light: the speed of light of the vacuum is 300,000 km/sec or 186,000 miles/sec. It is less than 0.1% in air.