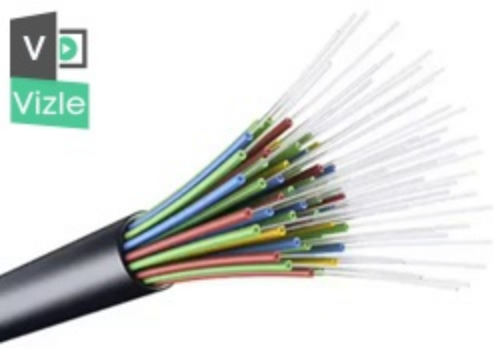
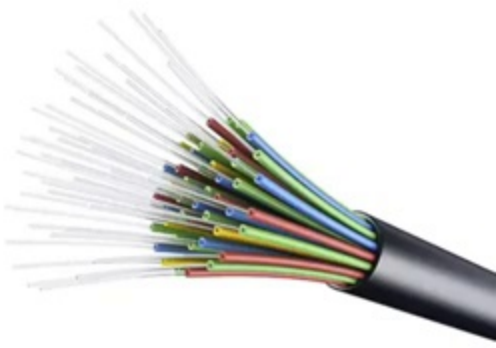


Optical Fiber Communication



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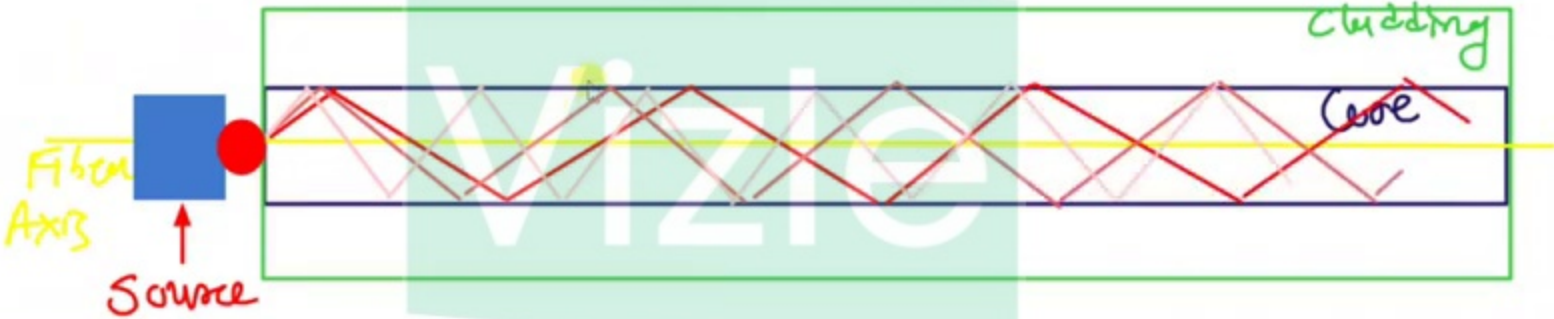
Types of Dispersion Loss

Material Dispersion Loss

- The material dispersion depends on the refractive index of material used to manufacture the fiber cable.
- The group velocity is the function of wavelength of light and the group velocity is also the function of refractive index of the material.
- Now depending on the light source, each spectral component of input source will be having different wavelength.

Waveguide Dispersion Loss

- Whenever the optical signals are passing through the fiber optic cable, then the optical cable is acting as wave guide.
- Now there is a variation in the wavelength of each spectral component emitted from the source.
- As well as the angle made by each light ray with respect to the axis of optical cable will be different.



Intermodal Dispersion Loss

- This type of dispersion is also called as 'Modal Dispersion'
- This dispersion takes place in case of multimode fiber optic cables.
- Here the different mode are travelling with different group velocities inside an optical fiber.
- Some modes are travelling with maximum speed, while some are travelling with minimum speed.
- Thus there is difference between the transit time of these modes.
- So all the modes are not coming to the output at the same time.
- This gives spreading of output pulse.
- This type of dispersion is called as intermodal dispersion.
- In case of multimode step index fiber, this dispersion is highest.
- It can be reduced by choosing an optimum refractive index profile.
- In case of graded index fiber it is less by factor of 100 times.

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