

VIVEKANANDA COLLEGE THAKURPUKUR KOLKATA-700063

NAAC ACCREDITED 'A' GRADE



Topic Diffraction phenomena of light(General discussion)

Course Title: Wave and Optics (Theory)

Paper: PHS-A-CC-2-4-TH

Unit: [2.2.1\(8\)](#)

Semester: 2

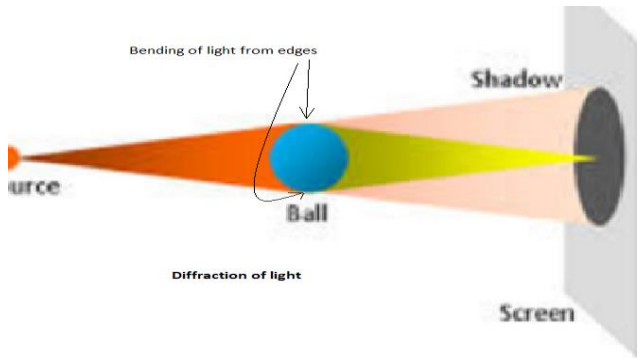
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Name of the Department: PHYSICS

Introduction to Diffraction of light

Definition:

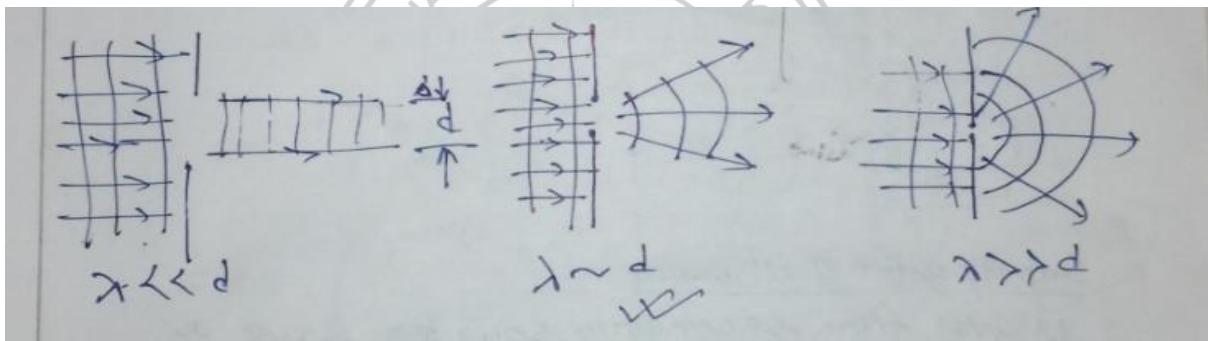
When waves incident on some obstacles, they can bend round the edges of the obstacles, if the dimensions of the obstacles are comparable to the light wavelength of the waves. This bending of light waves around the edges of an obstacle is called diffraction.



Bending of light from the edge of a sharp object make the dark image smaller than the actual dark image should be.

If size of the obstacle or hole is much greater than the wavelength of the used monochromatic light then rectilinear propagation of light

should be observed. But if the hole is comparable to the wavelength, then it can be seen that light get bend from the edge and we get diffraction pattern.

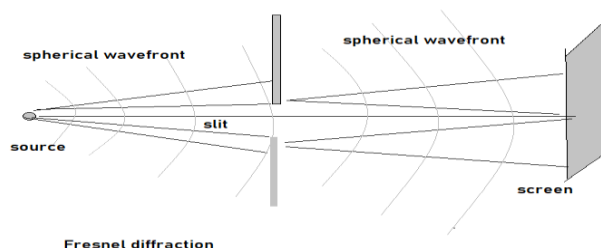


In this fig. the 1st one shows both incoming and outgoing wave fronts are plane wave and is rectilinear propagation of light. The 2nd one have wavelength $\lambda \approx$ slit width 'd' and the incoming wave front is plane but outgoing is spherical due to diffraction from edge. In the 3rd case slit width is so small that it behaves as a single point source.

Type of Diffraction:

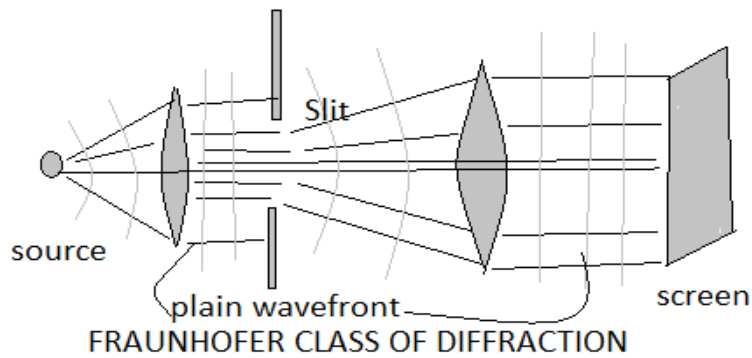
There are two type of diffraction depending on the distance of source and screen or use of incident and outgoing wave fronts.

1. **Fresnel class diffraction:-** in this case the source and screen both are placed at a finite distance from the slit i.e.



incident and outgoing waves both have spherical wavefront.

2. **Fraunhofer class of diffraction:-** in this case the source and screen both are placed at virtually infinite distance from the slit i.e.



the incident wave front and also outgoing wavefront are made plane wavefront using convex lens.

