EXPERIMENT

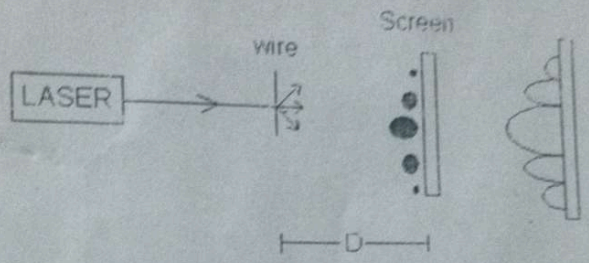
Object- To measure the diameter of a thin wire using the phenomenon of diffraction.

Item Required- A Helium-Neon laser, thin wire mounted in the holder, and a screen.

Theory- When a wire is illuminated by a laser beam, a diffraction pattern is observed on the screen. If 'd' is the diameter of the wire, diffraction is being observed at a distance 'D' from the screen, and 'X' is the width of the central maxima then

$$d = \lambda D/X$$

Where 'λ' is the wavelength of laser light.



Procedure- Illuminate the wire with the laser beam as shown in the figure and observe the diffraction pattern on the screen. Measure the distance D of the screen from wire and width of the central maxima X. Now apply the formula given above and find out the diameter of the wire. The wavelength of He-Ne laser light is 6328Å (6328×10^{-8} cm).

Observation Table-

S.No.	Distance from screen (D)	Width of central maxima (X) cm	Diameter of wire (d)
1.	100		
2.	150		
3.	200		
4.			
5.			

Result- Diameter of the given thin wire is found to be 0.025 cm

Precautions-

1. Do not see directly into the laser beam.
2. Keep the mounted wire about one meter away from laser and from the screen about 1 to 1.5 meter away.

plication of LASER :-

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one can calculate the wavelength of light (source) ser used in this experiment.

One can study the diffraction pattern of LASER.

We can calculated the value of N.A. by using LASER.

LASER can be very useful in measurement of atmospheric pollutants such as dust, smoke and flyash. Pulsed laser are used for this kind of work.

S/C lasers are used for printing.
(Semi Conductor)