Lecture-10

DIFFRACTION

Unit-01

DIFFRACTION

- INTRODUCTION
- DIFFERENCE BETWEEN DIFFRACTION AND INTERFERENCE

DIFFRACTION

INTRODUCTION

- In the previous chapter it was discussed that in order to produce an interference pattern, superposition of at least two beams or waves of light is necessary.
- The diffraction of light is described as the clear bending of waves around small obstacle and the spreading of waves to a certain extent into the region of geometrical shadow when a beam of light passes through a narrow slit.
- Also, small bubbles or imperfections in a glass lens produce unwanted diffraction patterns when a monochromatic light is transmitted through it. This phenomenon can be suitably explained only by assuming the wave nature of light.
- The effects of diffraction are generally more prominent for the waves when the size of the diffracting object is of the order of the wavelength of the wave. The diffraction also has negative implications. For example, the edges of optical images are seen to be blurred by the diffraction.
- Therefore, the phenomenon of diffraction leads to a basic limitation in resolution of the instruments like camera, telescope, microscope, etc.

DIFFRACTION

DIFFERENCE BETWEEN DIFFRACTION AND INTERFERENCE

- In simple words, the diffraction is the bending of light around an obstacle, whereas the interference is the meeting of two waves.
- However, the waves emerging from different parts of the same wavefront superimpose with each other to produce the diffraction pattern. The widths of the diffraction fringes are not equal, but the widths of the interference fringes may or may not be equal.
- If you focus on the points of minimum intensity, you will observe them as perfectly dark in the interference, but these points in the case of diffraction are not perfectly dark.
- Moreover, the bright fringes in the interference pattern are of uniform intensity but these are not of the same intensity in the diffraction pattern.