

# Wave optics



Here are the key differences between **interference** and **diffraction** of light:

Interference	Diffraction
<b>Definition:</b> Interference is the superposition of light waves from two or more coherent sources that results in the formation of alternating bright and dark fringes.	<b>Definition:</b> Diffraction is the bending or spreading of light waves around the edges of an obstacle or through a narrow slit, leading to the formation of a diffraction pattern.
<b>Source Requirement:</b> Requires at least two coherent light sources (such as in Young's double slit experiment).	<b>Source Requirement:</b> Can occur with a single wavefront interacting with an obstacle or a slit.
<b>Pattern Formation:</b> Interference fringes are typically of uniform width and are evenly spaced.	<b>Pattern Formation:</b> In diffraction, the fringes are not evenly spaced. The central bright fringe is wider and brighter, and the intensity of fringes diminishes as you move away from the center.
<b>Fringe Intensity:</b> All bright fringes in interference usually have nearly the same intensity.	<b>Fringe Intensity:</b> The intensity of the bright fringes in diffraction decreases rapidly as you move away from the central maximum.
<b>Cause:</b> Arises due to the superposition of light waves from two or more sources.	<b>Cause:</b> Arises due to the bending and spreading of light when it encounters an obstacle or passes through a small aperture.
<b>Occurrence:</b> Interference is seen prominently in experiments like Young's double slit experiment.	<b>Occurrence:</b> Diffraction is seen when light passes through a single slit, around edges, or through a grating.
<b>Effect of Slit Width:</b> In interference, the pattern depends on the distance between the two slits.	<b>Effect of Slit Width:</b> In diffraction, the pattern depends on the size of the slit. A narrower slit results in a wider diffraction pattern.