

Diffraction

1-Introduction:

Diffraction is one of the phenomena related to the wave nature of light. It occurs when a light or sound wave collides with an obstacle and is described as a very clear bending of waves around small obstacles and the spread of waves through small openings. The phenomenon of diffraction also occurs with elementary particles such as the electron and neutron, as elementary particles have wave properties, so diffraction of light occurs Also with matter and can be studied according to quantum mechanics. Diffraction is the deviation of light from its original path as a result of it passing through an obstacle or a small opening after which it approaches the wavelength of the light used.

2-Mechanism of Diffraction:

In visible light, the phenomenon of diffraction can occur when it passes through a narrow slit or (edge), so the waves deviate from their original path, and as a result, the waves interfere with each other, forming a new pattern known as the diffraction pattern. When neutral waves interfere with each other, new waves are produced with an amplitude that depends on the sum of the amplitudes of the interfering waves, as well as the phase difference between them, according to the principle of superposition, so the diffraction pattern is in the form of a series of peaks and troughs (maxima and minima).

3- types of diffraction:

There are multiple analysis models that describe the nature of diffraction, including Kirchhoff-Fresnel diffraction, which is derived through the wave equation of the photon using quantum optics, Fraunhofer diffraction, which is derived from the Fraunhofer equation by applying it to far fields, and Fresnel diffraction, which is applied to near field.

Examples of diffraction in our daily lives

maybe Watch the diffraction of light in:CD (compact discs) where there is DVD &It has circular grooves (paths) that are close together, and when light falls on them, the light is reflected to us in form, the familiar rainbow

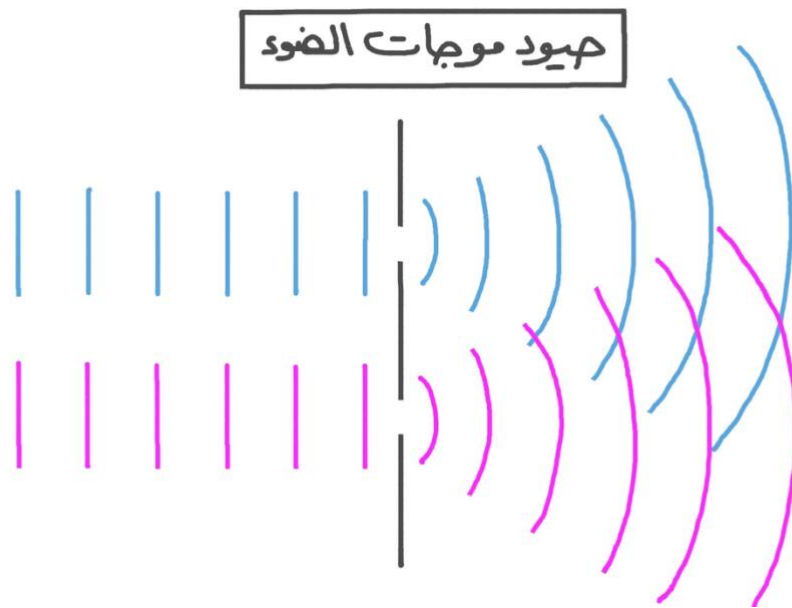
Optical diffraction also occurs in... AtmosphereAtoms where the rays are deflected when they collide

The air around the light source can...Bright streaks of light occur around a bright light sourceLike the sun or the moonThese rings around the moon appear to us especially in the presence of light clouds or fog.

Diffraction can happen to any type of wave ,sound waves can diffract About things, which is why we can hear someone while we are behind a wall onCorner. Diffraction can Its use in some technical applications also sets limits Essential for image clarity CameraTelescope or Microscope Diffraction of light The phenomenon of diffraction of light occurs, and the amount of bending depends on the size Much relative to the wavelength of light relative to the size of the aperture, if the aperture is larger The wavelength of light, the bending will be almost unnoticeable, but if both Are close in size, or equal, the amount of curvature will be large.

***Produces a diffraction pattern At any number of notches.**

***Diffraction is the change in the direction of a waveWhich passes near a body and changes direction °90**



Good luck