Answer on Question #53753-Physics-Electromagnetism

In photoelectric effect experiments, no photoelectrons are produced when the frequency of the incident radiation drops below a cutoff value (which varies depending on the metal used in the experiment), no matter how bright or intense the light is. How can you explain this fact using a “particle” theory of light instead of a wave theory of light?

Answer

When the frequency of light hitting a surface is lower than a cut-off value (threshold frequency), photons will not have enough energy to release electrons from the surface. This is because energy of a photon is directly proportional to frequency of the beam, rather than the amplitude of the wave (intensity).