

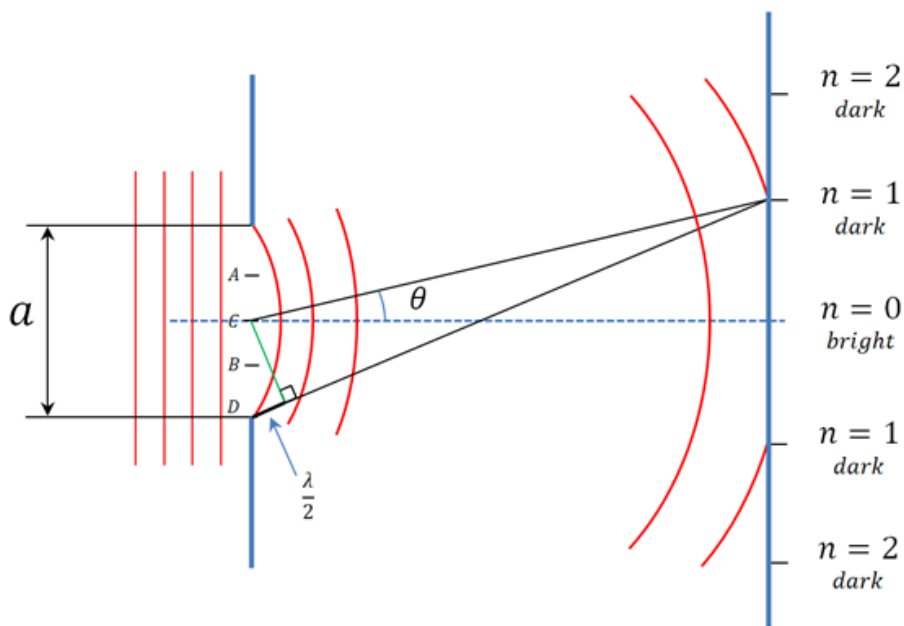
Answer on Question #73782, Physics / Optics

Question. In a single slit interference is observed? Justify your answer with proper comments.

Answer.

If light is made of particles, a beam of such particles should pass straight through a long, narrow slit and form a single spot on a screen placed beyond the slit. If it is wavelike in nature, a more complex pattern results. The light waves reaching a given point on the screen each arrive from a different part of the slit, so their amplitudes must be added, and an interference pattern results. Consider pairs of points separated by a distance of half the slit width, such as (A, B) or (C, D) in Figure below. There exists a location on the screen for which waves coming from point C are out of phase with waves from point D by exactly one-half of a wavelength, so their amplitudes add to zero.

The situation shown ($n = 1$) in Figure is for the first destructive minimum and occurs at two positions with angles $\sin \theta = \lambda/a$.



(More detail see [Max Born & Emil Wolf Principles of Optics](#) or

video <https://www.khanacademy.org/science/physics/light-waves/interference-of-light-waves/v/single-slit-interference>)

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