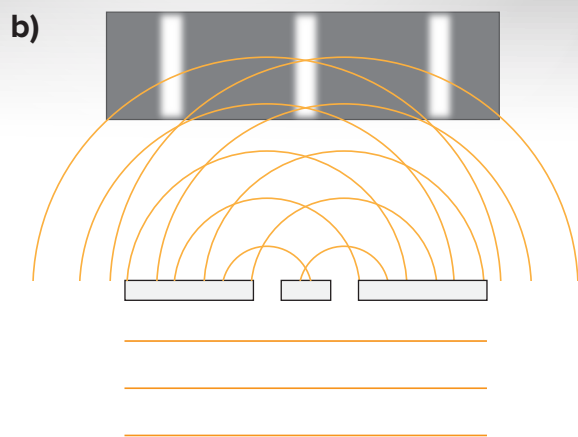
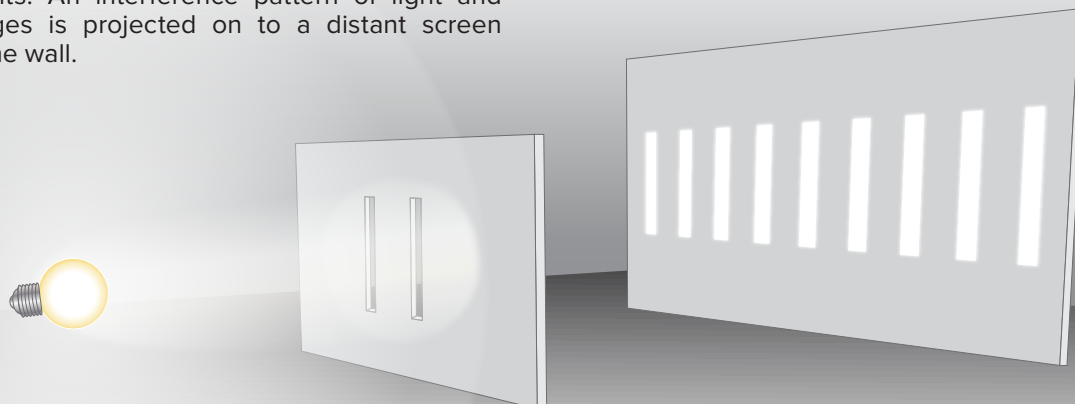


## The Double Slit Experiment

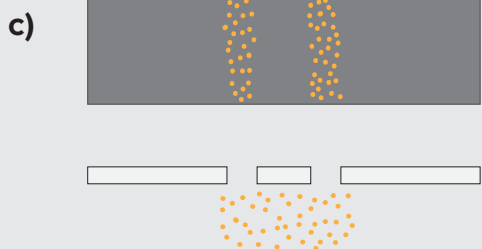
This classic experiment demonstrates that light can act as either a wave or a particle—apparently shifting its behavior based on how it is observed.

**a) Two Slits.** A light beam strikes a wall with two narrow slits. An interference pattern of light and dark fringes is projected on to a distant screen beyond the wall.



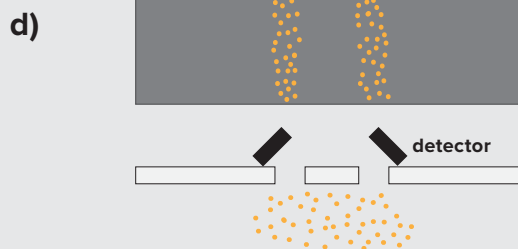
### Light is a wave?

This pattern is created because the light acts like a wave, rippling out beyond the slits. The 'ripples' interfere: where wave peaks combine 'constructively,' they create a bright fringe; where peaks meet with troughs 'destructively,' they cancel leaving a dark stripe.



### Light is a particle?

Turn down the intensity of the light beam, so that it spits out one photon at a time. You might expect the interference pattern to disappear and be replaced by two thick strips of light on the screen—as photons either pass directly through one slit or the other. But that does not happen. You don't see the pattern in (c). Instead, the wave-like behavior persists and an interference pattern gradually builds, as shown in (b), as single photons pass through. It is as if each individual photon interferes with itself.



### Shifting behavior

But, if you place a detector at each slit, to monitor how a single photon can apparently pass through two slits at once, the interference pattern vanishes. Now, you do just see two thick stripes, as shown in (c)—the light behaves like a beam of small indivisible particles. The double-slit experiment shows that light seems to shift its behavior—from wave to particle—depending on how it is monitored.