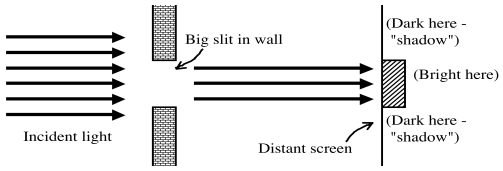
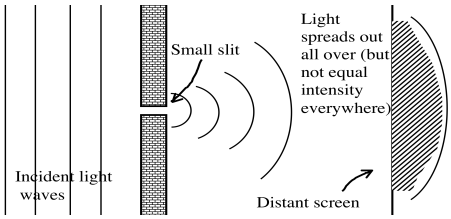
Light as rays: geometrical optics

Light as waves: physical optics

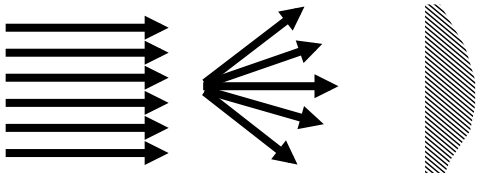
## Light as rays: geometrical optics

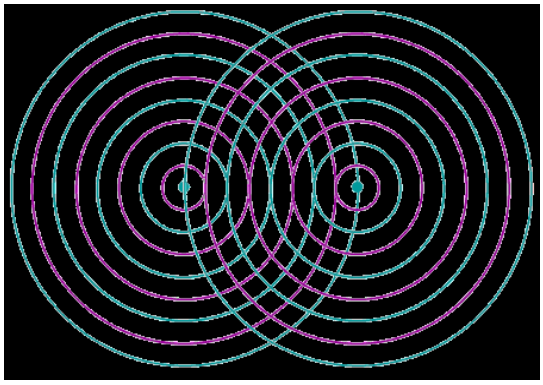


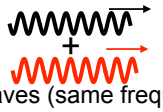
## Light as waves: physical optics




## Mixed model



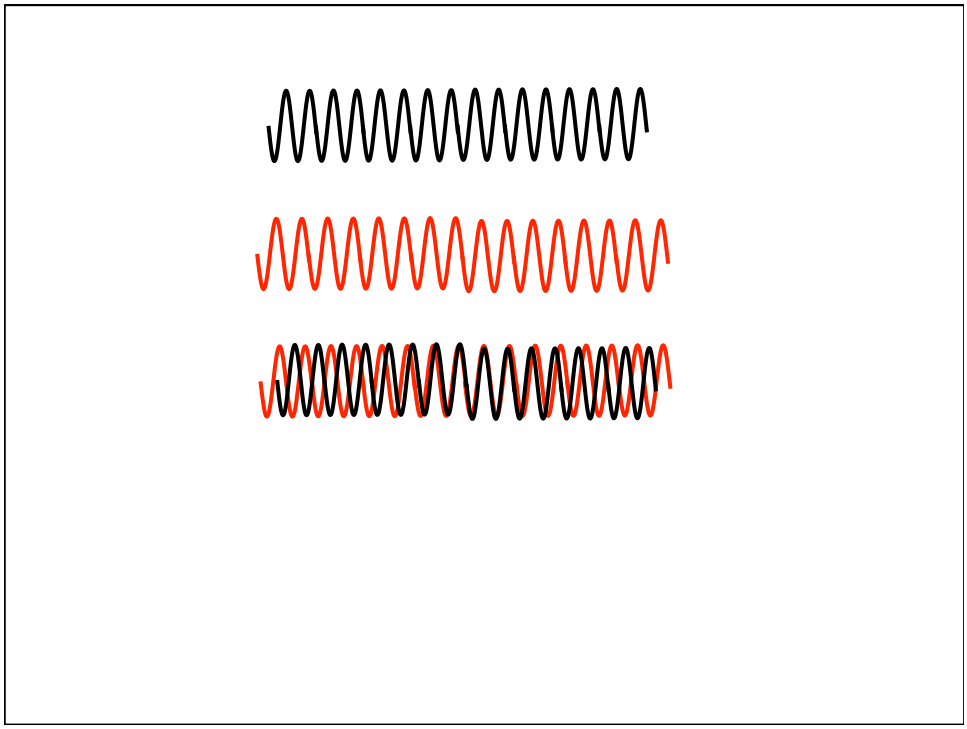


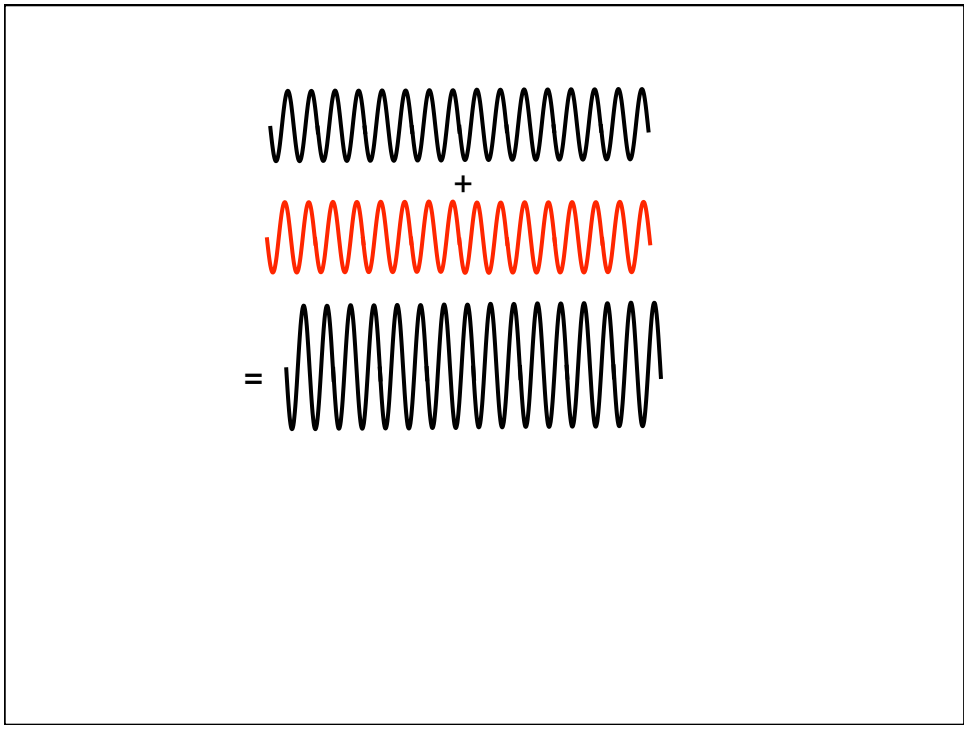


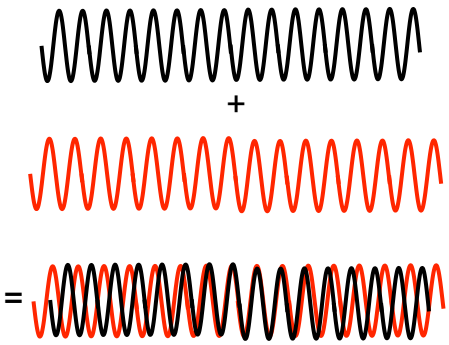
2 traveling sin waves (same frequency, in phase) travel together (same direction) in the same material, in the same place...

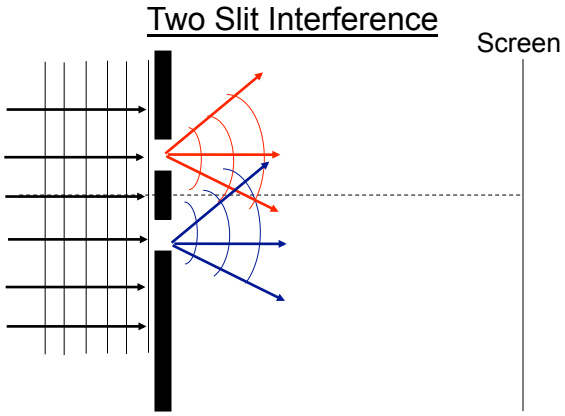
What happens when they “superpose”?

A) Result is *exact same* as either one individually
B) A standing wave (like a guitar string)
C) A traveling wave, but *twice* the amplitude
D) A traveling wave that gets bigger and smaller in amplitude as time goes by (“beats”)
E) something else entirely...

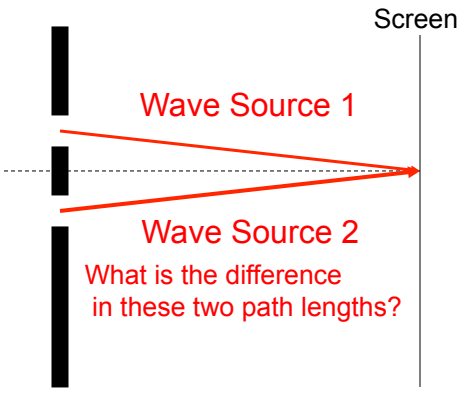




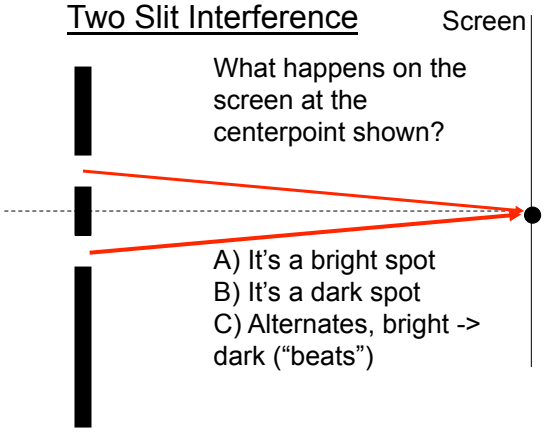

+
=


Two Slit Interference
Screen

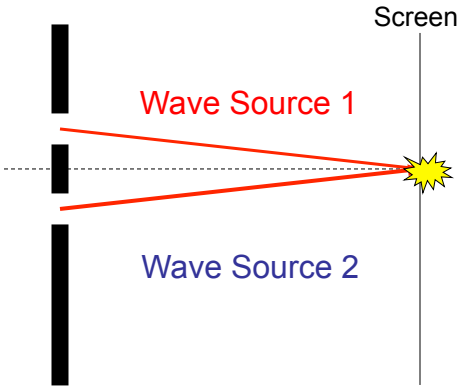
## Two Slit Interference



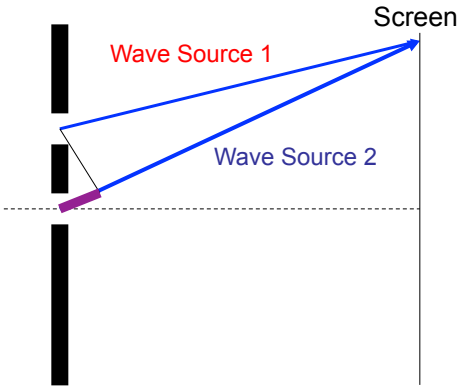

## Two Slit Interference



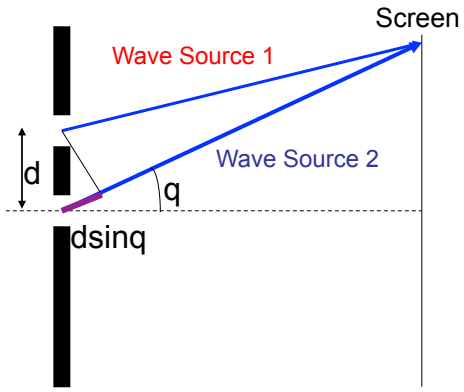
## Two Slit Interference

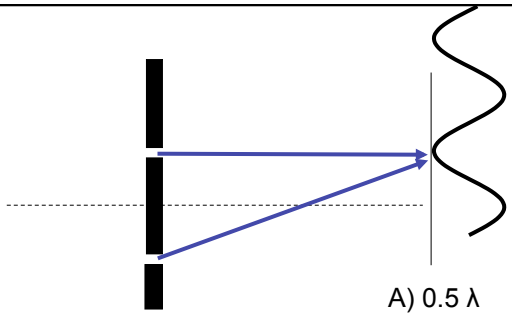



## Two Slit Interference



## Two Slit Interference



What is the difference in these two path lengths?

A) 0.5 λ
B) λ
C) 1.5 λ
D) 2 λ
E) None of these

Red light and green light are both shining on the same double slit (or, grating). Which pattern has the bright spots spread farther apart?

A) Green light bright spots are farther apart
B) Red light bright spots are farther apart.
C) All bright spots are equally far apart

Violet light (wavelength λ) passes through a pair of slits separated by d and forms a diffraction pattern on a screen. If the violet light is replaced with red light (wavelength 2λ) the original spatial pattern on the screen is reproduced if the slit distance is changed to

A) d/2 B) d/4
C) 2d D) 4d
E) no change is necessary.

Consider a diffraction pattern produced by a LASER through 2 slits separated by distance d. Now “d” is increased a little. To maintain the same pattern on the screen...

A) The wavelength of light should be increased.
B) The wavelength should be decreased.
C) The pattern did not change when d changed, so do nothing.
D) Something else/none of these