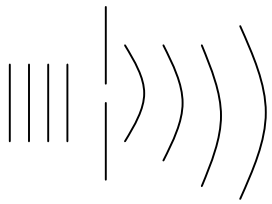
E. Wave Nature of Light

2 Competing Theories: 1. _____ 2. _____

Behavior of Light Supporting _____

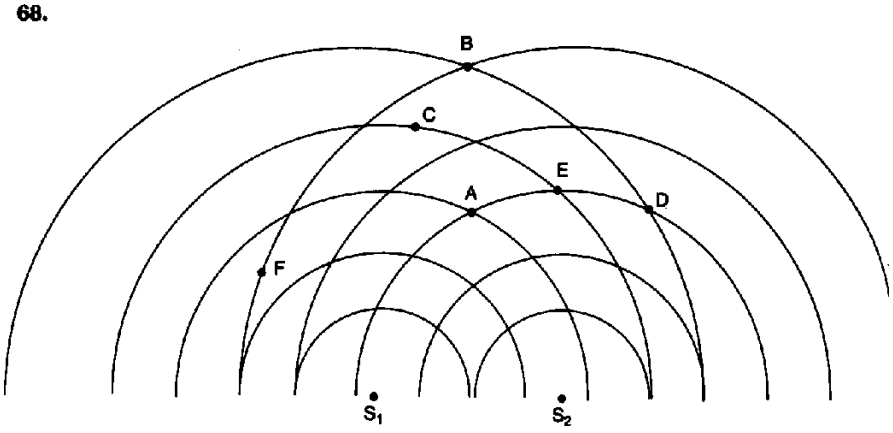
1. _____ – light _____ into the region behind an obstacle

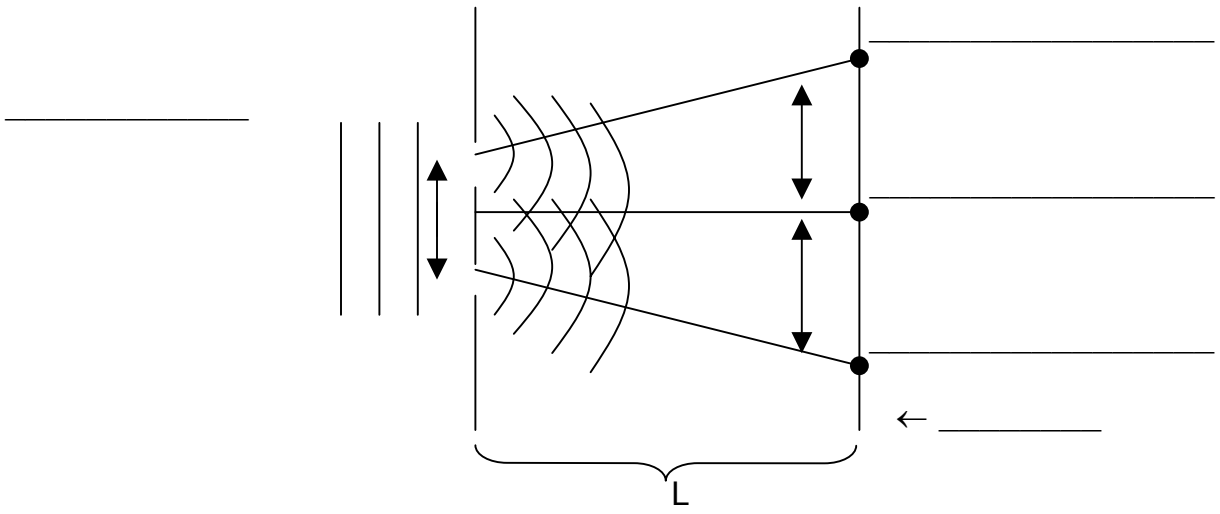


2. _____ – Young's Double Slit Late 1800's

Review of Interference

Lines of Constructive and Destructive Interference





If you draw a line from each slit to the 1st order bright line, you will notice that one line is longer than another. The _____ between these two **lines is _____**

Constructive Interference causes _____ Lines.

Destructive Interference causes _____Lines.

Ex) Calculate the distance between two slits in a Double Slit Experiment if the wavelength of the light used is 5×10^{-7} m and the distance between the central maximum and the first order bright line is 2×10^{-2} m The distance from the slits to the screen is 4 meters.

Step 1 - Underline all the information
Step 2 - Turn the info into the correct letters
Step 3 - Substitute and Solve

$$\frac{\lambda}{d} = \frac{x}{L}$$

Answer d = _____

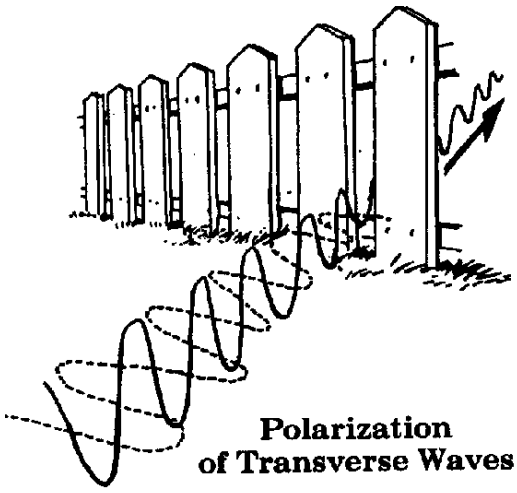
Question: If they give you **d, L and x** and asked you to find the COLOR of the light used, what would you do? Where would you go to find the color?

Answer:

More wave behaviors of light

Polarization - _____ of a beam of light producing light that vibrates in only one plane

- proves light is a _____ wave (it has an _____)



Doppler Effect for light

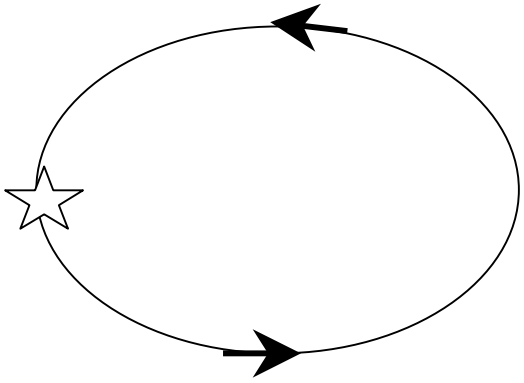
There is a change in the observed _____**(color)** of light

as a very fast source of the light _____from an observer.

♦ Observed in _____moving stars

Memory Trick - "BLUE TO" "RED AWAY"

Star's colors become _____



Observer

Star's colors become _____

Summary - Why do we think light is a wave?

Diffraction - _____

Interference - _____

Polarization -
_____

Doppler Effect - _____

Electromagnetic Radiation - Wavelength and Frequency

Can you remember them? … In order?

See Reference Table

Which one has the smallest wavelength? (hint: most penetrating)

Which one has the smallest frequency? (hint: how are wavelength and frequency related?)

Which color has the greatest wavelength? _____

Smallest? _____