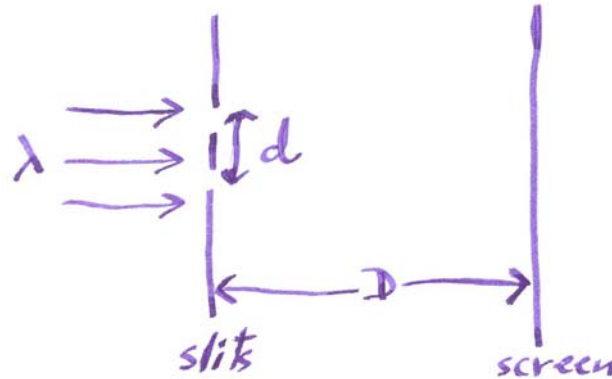


Consider the interference between two slits separated by a distance d on which light of wavelength λ shines, producing a pattern of dark and bright fringes on a screen a distance D away from the slits.

First draw a sketch of this physical situation, showing light shining on two slits and passing through them to the screen beyond it.



Then calculate and enter in the tables below the first three angles at which interference maxima (bright fringes) and interference minima (dark fringes) occur for red (700 nm) and violet (400 nm) light for the different separations shown, and the positions of these bright and dark fringes (relative to the central maximum) on the screen.

Separation $d = 10.0 \mu\text{m}$

	Angle	Position when $D = 1.0 \text{ m}$	Position when $D = 2.0 \text{ m}$
RED LIGHT			
First minimum	2.01°	3.5 cm	7.0 cm
First maximum	4.01°	7.0 cm	14.0 cm
Second minimum	6.03°	10.6 cm	21.2 cm
Second maximum	8.05°	14.2 cm	28.4 cm
Third minimum	10.1°	17.9 cm	35.7 cm
Third maximum	12.1°	21.6 cm	33.3 cm
VIOLET LIGHT			
First minimum	1.15°	2.0 cm	4.0 cm
First maximum	2.29°	4.0 cm	8.0 cm
Second minimum	3.44°	6.0 cm	12.0 cm
Second maximum	4.59°	8.0 cm	16.1 cm
Third minimum	5.74°	10.1 cm	20.1 cm
Third maximum	6.89°	12.1 cm	24.2 cm

Separation $d = 20.0 \mu\text{m}$

	Angle	Position when $D = 1.0 \text{ m}$	Position when $D = 2.0 \text{ m}$
RED LIGHT			
First minimum	1.00°	1.8 cm	3.5 cm
First maximum	2.01°	3.5 cm	7.0 cm
Second minimum	3.01°	5.3 cm	10.5 cm
Second maximum	4.01°	7.0 cm	14.0 cm
Third minimum	5.02°	8.8 cm	17.6 cm
Third maximum	6.03°	10.1 cm	21.2 cm
VIOLET LIGHT			
First minimum	0.57°	1.0 cm	2.0 cm
First maximum	1.15°	2.0 cm	4.0 cm
Second minimum	1.72°	3.0 cm	6.0 cm
Second maximum	2.29°	4.0 cm	8.0 cm
Third minimum	2.87°	5.0 cm	10.0 cm
Third maximum	3.44°	6.0 cm	12.0 cm

Now look at the results and summarize how the following affect the pattern (making the fringes farther apart or closer, or whatever):

increasing the wavelength of the incident light:

This widens the pattern (maxima and minima at larger angles)

increasing the separation of the slits:

This narrows the pattern.

increasing the distance to the screen:

This widens the pattern out on the screen.