PHY250: Single Slit diffraction

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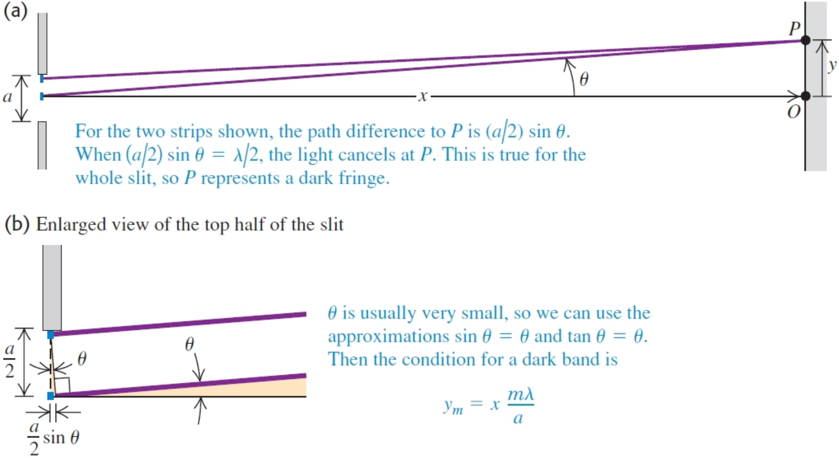
Fall 2021

Let us calculate the wavelength of a laser

Position of dark fringes in a single slit of width *a*



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for small angles:

$$\frac{y_m}{x} = \frac{m\lambda}{a} \rightarrow y_m = x\frac{m\lambda}{a}$$

Intensity of the pattern

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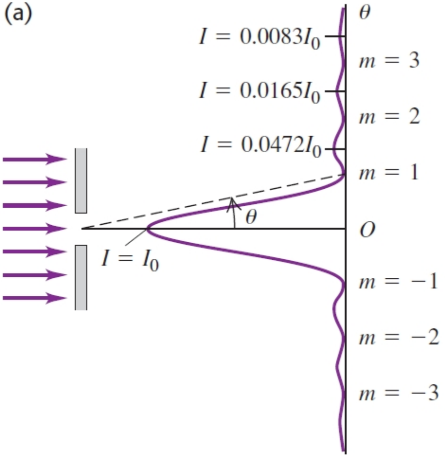
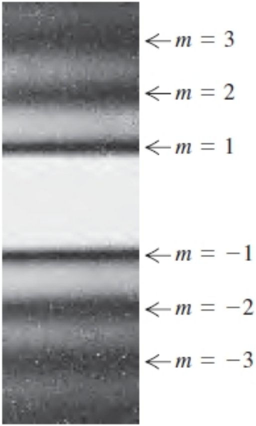


What we observe is something like this

Position of dark fringes in a single slit of width *a*



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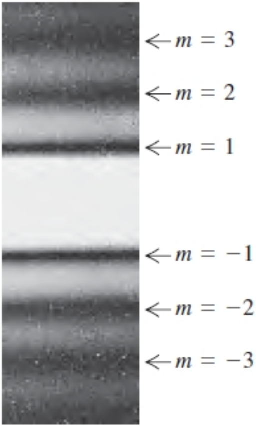

Then, if we know the position of the first dark fringe, the width of the slit and the distance to the screen, we can calculate λ for a given source:

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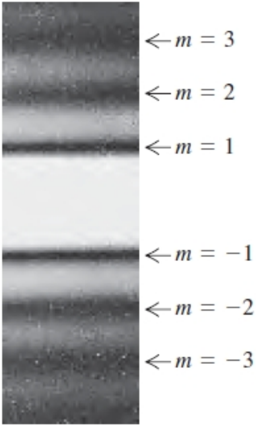

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$$\lambda = \frac{a y_m}{x m}$$