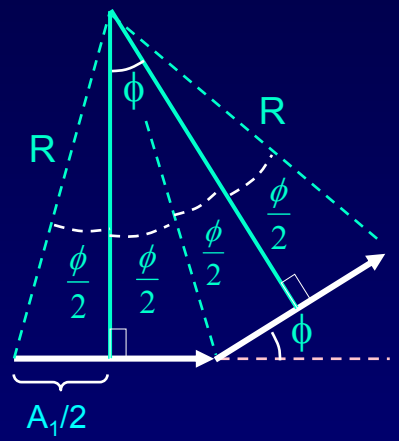
Multi-Slit Interference (2)

The intensity for N equally spaced slits is found from phasor analysis.

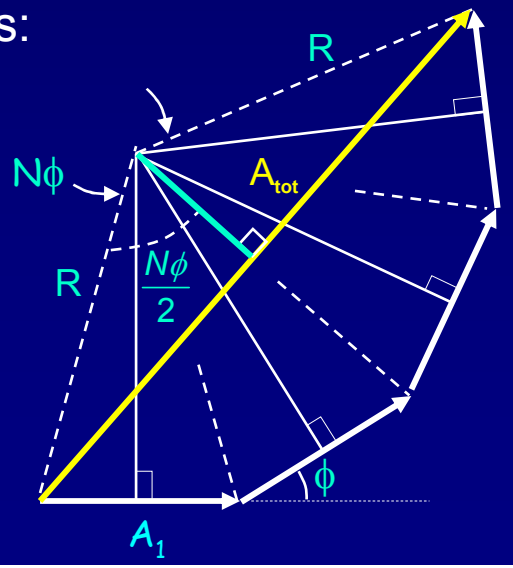
Draw normal lines bisecting the phasors. They intersect, defining R as shown:



$$\frac{A_1}{2} = R\sin\frac{\phi}{2} \Rightarrow R = \frac{A_1}{2\sin(\phi/2)}$$

Substitute

N slits:



$$\frac{A_{tot}}{2} = R\sin\frac{N\phi}{2} \Rightarrow$$

$$A_{tot} = A_1\frac{\sin(N\phi/2)}{\sin(\phi/2)}$$

$$I_{tot} = I_1\left(\frac{\sin(N\phi/2)}{\sin(\phi/2)}\right)^2$$