Diffraction from gratings

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

The slit/line spacing determines the location of the peaks (and the angular dispersing power $\theta(\lambda)$ of the grating:

The positions of the principal interference maxima are the *same* for any number of slits!

$$\boxed{d \sin\theta = m\lambda}$$

The number of slits/beam size determines the *width* of the peaks (narrower peaks easier to resolve).

$$\delta\theta \approx \lambda/Nd$$

Resolving power of an N-slit grating: The Rayleigh criterion