

38. (a) For the maximum with the greatest value of $m (= M)$ we have $M\lambda = a \sin \theta < d$, so $M < d/\lambda = 900 \text{ nm}/600 \text{ nm} = 1.5$, or $M = 1$. Thus three maxima can be seen, with $m = 0, \pm 1$.
- (b) From Eq. 37-25

$$\begin{aligned}\Delta\theta_{\text{hw}} &= \frac{\lambda}{Nd \cos \theta} = \frac{d \sin \theta}{Nd \cos \theta} = \frac{\tan \theta}{N} = \frac{1}{N} \tan \left[\sin^{-1} \left(\frac{\lambda}{d} \right) \right] \\ &= \frac{1}{1000} \tan \left[\sin^{-1} \left(\frac{600 \text{ nm}}{900 \text{ nm}} \right) \right] = 0.051^\circ .\end{aligned}$$