



π -shifts cancel

$$0 + \frac{(2d)n(2\pi)}{510 \text{ nm}} = \pi \quad \leftarrow \text{first destructive}$$

\uparrow no phase shift contribution
 \uparrow path difference contribution

$$\frac{4d(1.39)\pi}{510 \text{ nm}} = \pi$$

$$d = \frac{510}{4(1.39)} = \underline{91.73 \text{ nm thick}}$$

$$\text{phase red} = \frac{4(91.73)(1.39)\pi}{700} = 2.29$$

$$\text{phase violet} = \frac{4(91.73)(1.39)\pi}{400} = 4.01$$

w/ dispersion

$$\text{phase red} = \frac{4(91.73)(1.38)\pi}{700} = 2.27$$

$$\text{phase violet} = \frac{4(91.73)(1.40)\pi}{400} = 4.03$$

wider range
 farther from
 π -anti-reflective
 thus worsens