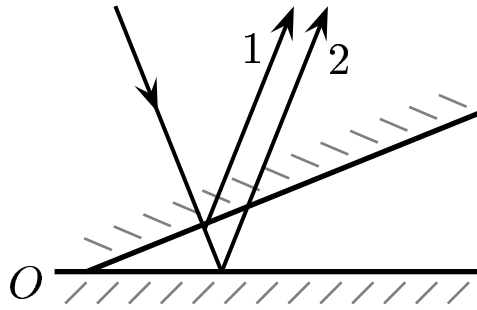


Consider a very thin wedge shaped air film. (Diagram is not drawn to scale.) Due to the extra path, ray #2 has an additional phase $\phi_{path} = 2.1 \pi$.



Determine number of dark fringes in the interval OA . The dark fringe at O is the first fringe. After that a dark fringe is included in the count only if the minimum is present.

- A) $N_{dark} = 1$
- B) $N_{dark} = 2$
- C) $N_{dark} = 3$
- D) $N_{dark} = 4$

$$N_{dark} = \text{Integer} \left(\frac{\phi}{2\pi} + \frac{1}{2} \right), \text{ with } \phi = \phi_{path} + |\phi_{refl1} - \phi_{refl2}| \text{ and "round$$

down rule": e.g. $\text{Integer}(3.9) = 3$. Therefore

$$\phi = \phi_{path} + \pi = 3.1\pi.$$

$$N_{dark} = \text{Integer} \left(\frac{3.1\pi}{2\pi} + 0.5 \right) = 2.$$

Answer **B**.

37.06-05 Counting Dark Fringes 2004-3-24