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 $\phi_{\text{path}} = 2.1\pi$.

Determine number of dark fringes in the interval $O.A$. 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) $N_{\text{dark}} = 1$
B) $N_{\text{dark}} = 2$
C) $N_{\text{dark}} = 3$
D) $N_{\text{dark}} = 4$

$$N_{\text{dark}} = \text{Integer} \left( \frac{\phi}{2\pi} + \frac{1}{2} \right), \text{ with } \phi = \phi_{\text{path}} + |\phi_{\text{refl1}} - \phi_{\text{refl2}}| \text{ and "round down rule"}: \text{ e.g. Integer}(3.9) = 3. \text{ Therefore}$$

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

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

Answer B.

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