



To find the time difference, need to find the path difference

$$\Delta d = d_1 - d_2$$

From geometry:

$$d_1^2 = (r \cos \theta)^2 + (r \sin \theta + l)^2$$

$$d_1 = 5.071204 \text{ m}$$

$$d_2^2 = (r \cos \theta)^2 + (r \sin \theta - l)^2$$

$$d_2 = 4.929796 \text{ m}$$

∴ time difference

$$\Delta t = t_1 - t_2 = \frac{d_1}{v_s} - \frac{d_2}{v_s} = \frac{d_1 - d_2}{v_s}$$

$$= 4.123 \times 10^{-4} \text{ s} = 412.3 \text{ } \mu\text{s}$$

In water:  $v_s = 1480 \text{ m/s}$

$$\text{So, } \Delta t = 95.5 \text{ } \mu\text{s}$$

too close to notice.