

2. Comparing the light speeds in sapphire and diamond, we obtain

$$\begin{aligned}\Delta v &= v_s - v_d = c \left(\frac{1}{n_s} - \frac{1}{n_d} \right) \\ &= (2.998 \times 10^8 \text{ m/s}) \left(\frac{1}{1.77} - \frac{1}{2.42} \right) = 4.55 \times 10^7 \text{ m/s} .\end{aligned}$$