

4. Since $\Delta\lambda \ll \lambda$, we find Δf is equal to

$$\left| \Delta \left(\frac{c}{\lambda} \right) \right| \approx \frac{c\Delta\lambda}{\lambda^2} = \frac{(3.0 \times 10^8 \text{ m/s})(0.0100 \times 10^{-9} \text{ m})}{(632.8 \times 10^{-9} \text{ m})^2} = 7.49 \times 10^9 \text{ Hz} .$$