

63. (a) Since $\omega = 2\pi f$, Eq. 18-15 leads to

$$\Delta p_m = v\rho(2\pi f)s_m \implies s_m = \frac{1.13 \times 10^{-3} \text{ Pa}}{2\pi(1665 \text{ Hz})(343 \text{ m/s})(1.21 \text{ kg/m}^3)}$$

which yields $s_m = 0.26 \text{ nm}$. The nano prefix represents 10^{-9} . We use the speed of sound and air density values given at the beginning of the exercises and problems section in the textbook.

- (b) We can plug into Eq. 18-27 or into its equivalent form, rewritten in terms of the pressure amplitude:

$$I = \frac{1}{2} \frac{(\Delta p_m)^2}{\rho v} = \frac{1}{2} \frac{(1.13 \times 10^{-3} \text{ Pa})^2}{(1.21 \text{ kg/m}^3)(343 \text{ m/s})} = 1.5 \text{ nW/m}^2 .$$