

18. (a) The power received is

$$P_r = (1.0 \times 10^{-12} \text{ W}) \frac{\pi[(1000 \text{ ft})(0.3048 \text{ m/ft})]^2/4}{4\pi(6.37 \times 10^6 \text{ m})^2} = 1.4 \times 10^{-22} \text{ W} .$$

- (b) The power of the source would be

$$P = 4\pi r^2 I = 4\pi[(2.2 \times 10^4 \text{ ly})(9.46 \times 10^{15} \text{ m/ly})]^2 \left[\frac{1.0 \times 10^{-12} \text{ W}}{4\pi(6.37 \times 10^6 \text{ m})^2} \right] = 1.1 \times 10^{15} \text{ W} .$$