

32.7. Model: The magnetic field is that of a moving charged particle.

Visualize: Please refer to Figure Ex32.7.

Solve: Using the Biot-Savart law,

$$B = \frac{\mu_0}{4\pi} \frac{qv\sin\theta}{r^2} = \frac{(10^{-7} \text{ T m / A})(1.60 \times 10^{-19} \text{ C})(2.0 \times 10^7 \text{ m / s})\sin 135^\circ}{(1.0 \times 10^{-2} \text{ m})^2 + (1.0 \times 10^{-2} \text{ m})^2} = 1.13 \times 10^{-15} \text{ T}$$

The right-hand rule applied to the *proton* points \vec{B} out of the page. Thus, $\vec{B} = 1.13 \times 10^{-15} \hat{k} \text{ T}$.