

## Biot-Savart Law

$\mu_0$  = permeability of free space

Units: Tm/A

$$\mu_0 = 4\pi \times 10^{-7} \text{ Tm/A}$$

$$d\vec{B} = \frac{\mu_0}{4\pi} \frac{Id\vec{l} \times \hat{r}}{r^2}$$

$$B = \frac{\mu_0 I}{4\pi x} \frac{2a}{\sqrt{x^2 + a^2}}$$

As  $a \rightarrow \infty$ ,

$$B = \frac{\mu_o I}{2\pi r}$$