Energy in B field

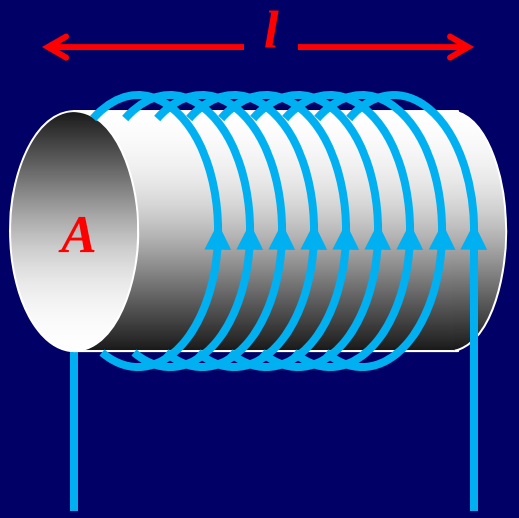
Magnetic Fields

- Recall Inductor Energy:

  $U = \frac{1}{2} L I^2$

- Energy Density (U/Volume):

  $u_B = \frac{1}{2} B^2/\mu_0$



$$L = \mu_o n^2 l A \qquad B = \mu_o n I$$

$$U = \frac{1}{2} L I^2 = \frac{1}{2}\left(\mu_0 n^2 l A\right)\frac{B^2}{\mu_0{}^2 n^2} = \frac{1}{2}\frac{B^2}{\mu_0} Al$$