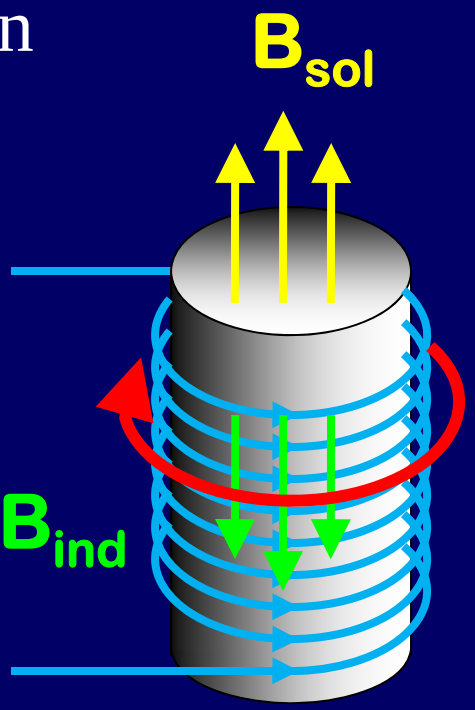
Self-Inductance

Recall from last time the solenoid cannon



- Changing current
- Changing B_{sol} field
- Changing Φ through itself!
  - Φ proportional to I: $\Phi = LI$

"Inductance"

- Induced EMF (voltage)
  - Recall Faraday's law:

$$\varepsilon = -\frac{\Delta\Phi}{\Delta t} = -L\frac{\Delta I}{\Delta t} = -L\frac{I_f - I_i}{t_f - t_i}$$

- Direction
  - Given by Lenz's Law
  - Opposes change in current!

Units: L = ε t / I
1 H = 1V-sec/amp