Mutual Inductance

Primary Coil   **Secondary Coil**
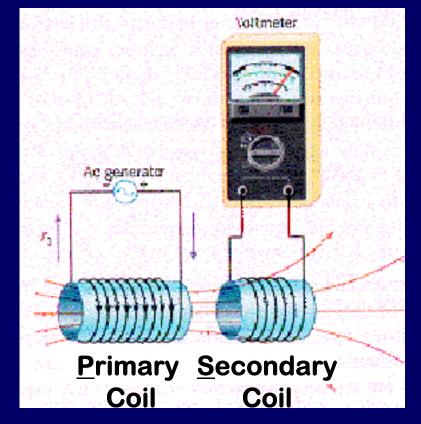
- AC Generator
- Changing current in P
- Changing B-field thru P
- Changing B-field thru S
- Changing Φ thru S
  - Φ_S proportional to I_P: $\Phi_s = MI_p$

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

$$\varepsilon = -\frac{\Delta \Phi}{\Delta t} = -\frac{\Phi_f - \Phi_i}{t_f - t_i}$$

"Mutual Inductance"

$$\varepsilon_s = -M\frac{\Delta I_p}{\Delta t}$$

Demo