

## AMPÈRE'S LAW

→ Magnetic field of a long, straight wire:

$$B = \frac{\mu_0}{4\pi} \frac{2I}{r}$$

$$\oint \vec{B} \cdot d\vec{\ell} = \left( \frac{\mu_0}{4\pi} \frac{2I}{r} \right) \underbrace{\oint d\ell}_{= 2\pi r}$$

$$\boxed{\oint \vec{B} \cdot d\vec{\ell} = \mu_0 I}$$

• Magnetic Flux

$$\Phi_B = \int \vec{B} \cdot d\vec{A}$$

• Magnetic Field of a solenoid:

$$B = \frac{\mu_0 N I}{L}$$

$N \rightarrow$  number of turns

$I \rightarrow$  current

$L \rightarrow$  length