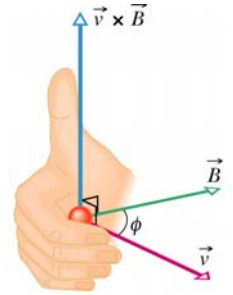
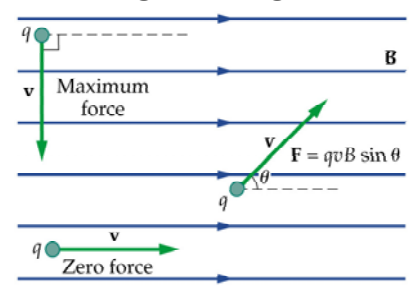


Equations Ch. 20-22

magnetic force on moving charge

$$F_B = |q|vB \sin \phi$$

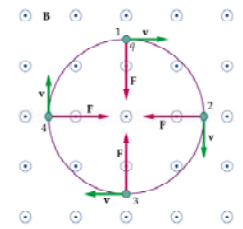


Circular motion in magnetic field

$$F = |q|vB = \frac{mv^2}{r}$$

$$r = \frac{mv}{|q|B}$$

$$T = \frac{2\pi m}{|q|B}$$



force on current

$$F = ILB \sin \theta$$

magnetic torque

$$\tau = IBA \sin \theta$$

magnetic field from long current

$$B = \frac{\mu_0 i}{2\pi R}$$

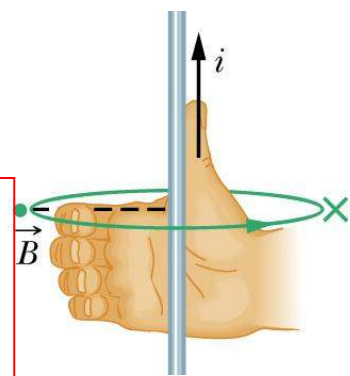
$$F_{ba} = \frac{\mu_0 L i_a i_b}{2\pi d}$$

Faraday's law

$$\mathcal{E} = - \frac{\Phi_f - \Phi_i}{t_f - t_i}$$

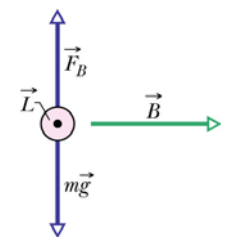
$$\Phi = BA \cos \vartheta$$

Lenz's Law: An induced current always flows in a direction that opposes the change that caused it.



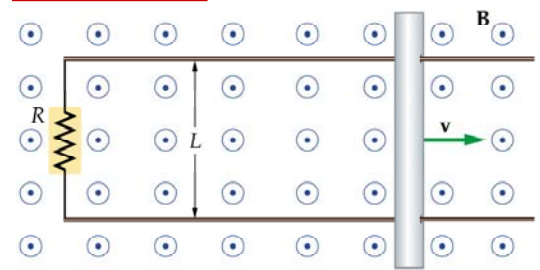
magnetic levitation

$$ILB = mg$$



$$\mathcal{E} = Blv$$

Motional emf



Alternating current

$$V = V_{\max} \sin \omega t$$

$$V_{rms} = I_{rms} R$$

$$\omega = 2\pi f = 2\pi / T$$

$$V_{rms} = V_{\max} / \sqrt{2}$$

$$I_{rms} = I_{\max} / \sqrt{2}$$