EFFETTO JOULE

$$L = q\,\Delta V = I \cdot \Delta t \cdot \Delta V$$

$$I = \frac{q}{\Delta t} \rightarrow q = I \cdot \Delta t$$

$$W = \frac{L}{\Delta t} = \frac{I \cdot \Delta t \cdot \Delta V}{\Delta t} = I \cdot \Delta V$$

Potenza

Potenza dissipata dal filo

$$R = \frac{\Delta V}{I} \rightarrow \Delta V = RI$$

$$I = \frac{\Delta V}{R}$$

$$W = I \cdot \Delta V = I \cdot RI = RI^2$$

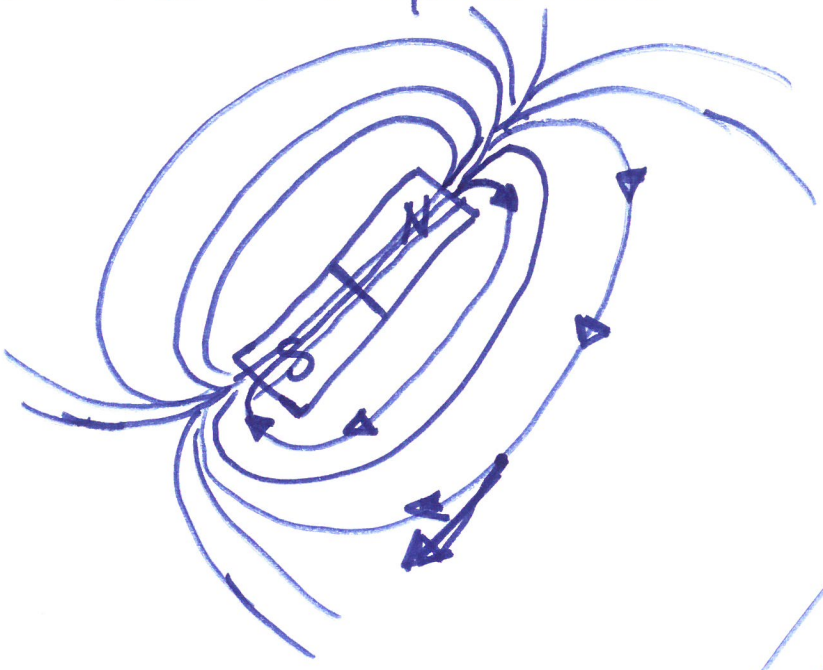
$$W = I \cdot \Delta V = \frac{\Delta V}{R} \cdot \Delta V = \frac{\Delta V^2}{R}$$

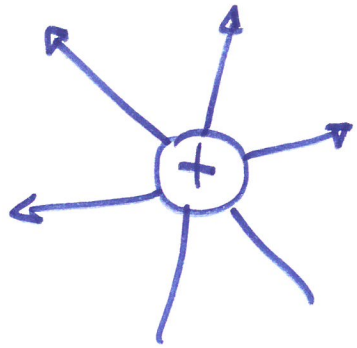
$$Q = \frac{L}{J} = \frac{I \cdot \Delta t \cdot \Delta V}{J}$$

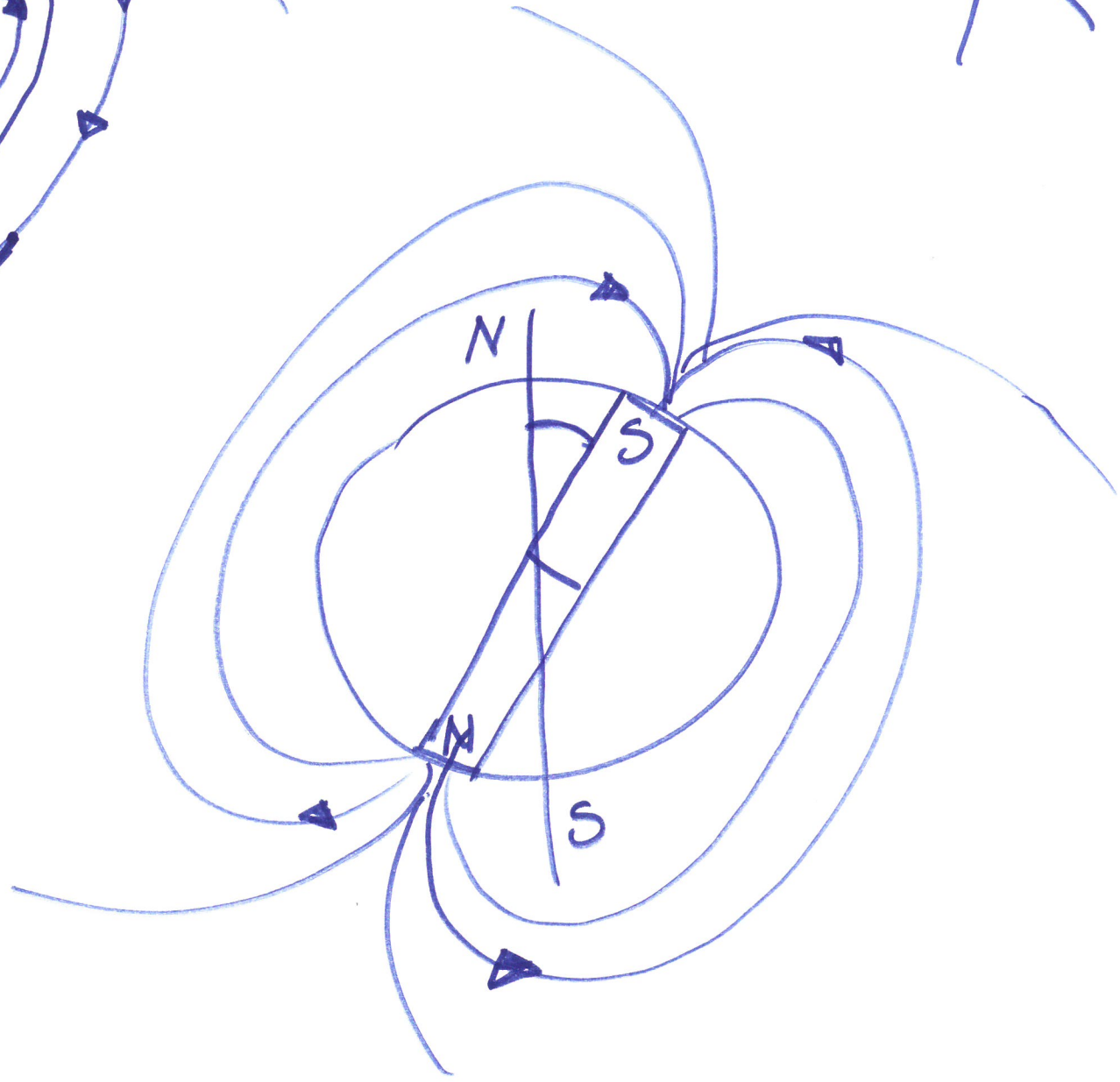
= equivalente meccanico della CALORIA

$$1\,cal = 4{,}18\,J$$

CAMPO MAGNETICO

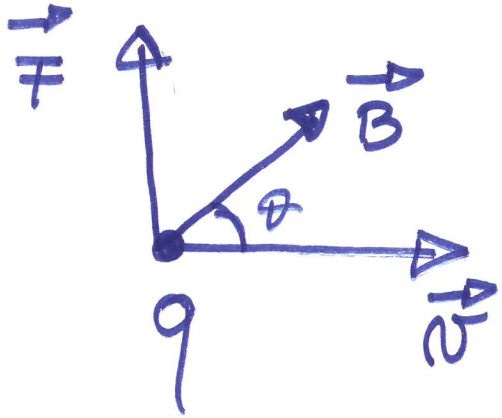






$$\vec{F} = q\,\vec{v} \times \vec{B}$$

FORZA di LORENTZ



$$F = qvB \sin\theta$$

$$F \perp v \rightarrow L = 0$$

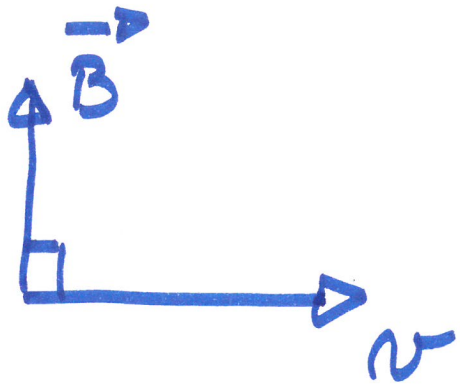
$$\vec{F} \cdot \vec{s} = F \cdot s \cos\alpha \qquad F \perp s \qquad \alpha = \frac{\pi}{2}$$

$$F = qvB \sin\theta$$

$$B = \frac{F}{qv \sin\theta} \rightarrow \frac{N}{C\,\frac{m}{s}} = \frac{N \cdot s}{C \cdot m} = [T]$$

TESLA

MOTO PARTICELLA IN B



$B \perp v$

$$\vec{F} = q\vec{v} \times \vec{B}$$

$\vec{F} \perp \vec{v}$ → moto circolare

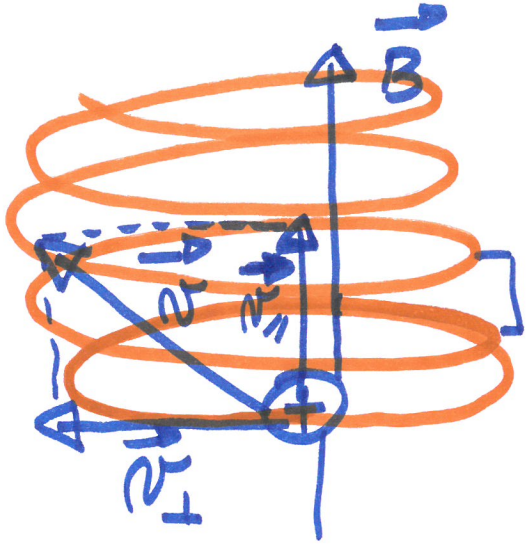
acc. centripeta

$$F = qvB \sin\frac{\pi}{2} = qvB = ma = m\frac{v^2}{R}$$

$\sin\frac{\pi}{2} = 1$

$$qvB = m\frac{v}{R}$$

$$R = \frac{mv}{qB}$$



F per $v_{\parallel}$ al campo B

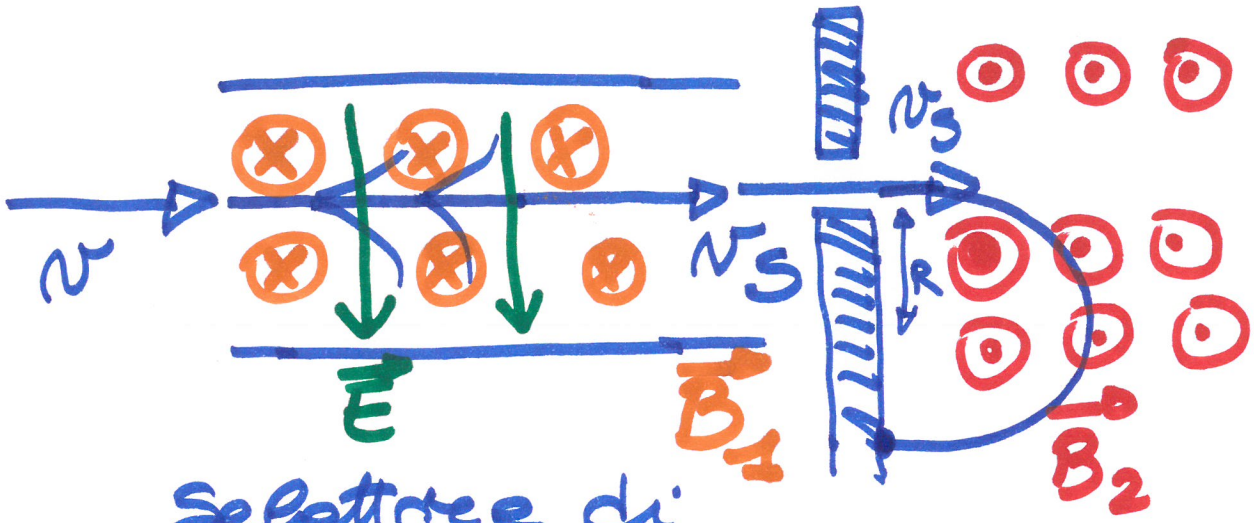
$$F = q v_{\parallel} B \sin 0 = 0$$

Raggio dell'elica dato da $v_{\perp}$

PASSO dato dalla $v_{\parallel}$

Spettrometro di massa

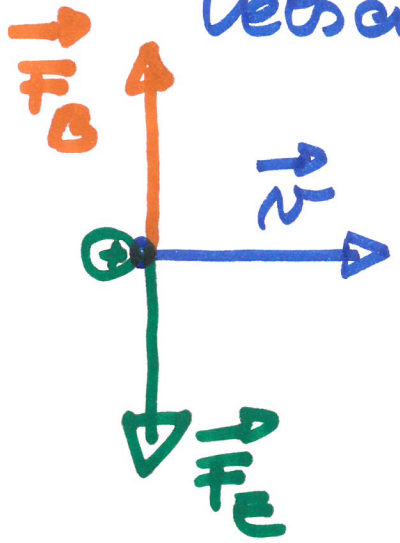
Separa gli ioni in base al rapporto $\frac{m}{q}$



$$R = \frac{m v_s}{q B_2}$$

$$\frac{m}{q} = \frac{R B_2}{v_s}$$

Selettore di velocità



$$\vec{F}_E = q\vec{E}$$

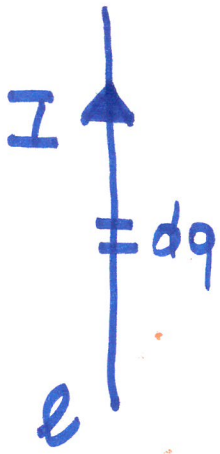
$$\vec{F}_B = q\vec{v} \times \vec{B}_1$$

$$\vec{F} = \vec{F}_B + \vec{F}_E = 0$$

$$qvB_1 - qE = 0$$

$$v_s = \frac{E}{B_1}$$

$$\vec{F}_B = q\vec{v}\times\vec{B}$$



$$d\vec{F}_B = dq\,\vec{v}\times\vec{B} = I\,dt\,\vec{v}\times\vec{B} =$$

$$I = \frac{q}{\Delta t} \rightarrow I = \frac{dq}{dt} \rightarrow dq = I\,dt$$

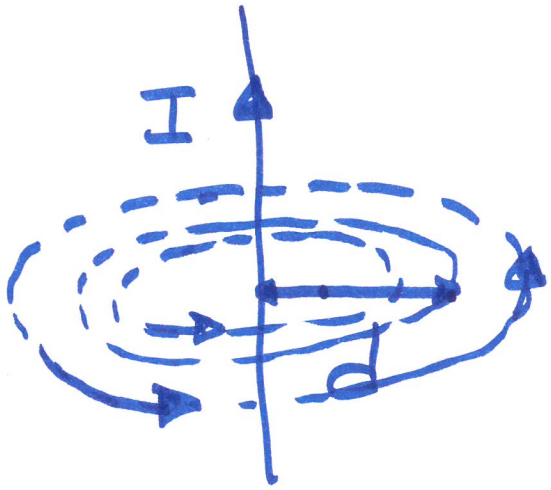
$$d\vec{F}_B = I\,\cancel{dt}\cdot\frac{d\vec{\ell}}{\cancel{dt}}\times\vec{B} = I\,d\vec{\ell}\times\vec{B}$$

$$\vec{v} = \frac{d\vec{\ell}}{dt}$$

$$\boxed{\vec{F}_B = I\,\vec{\ell}\times\vec{B}}$$

LEGGE di AMPERE

CAMPO B GENERATO DA UN FILO PERCORSO da I



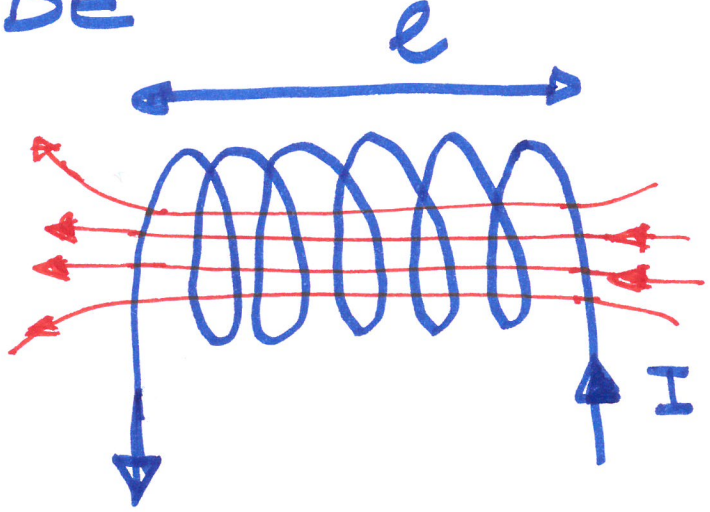
$$B = \frac{\mu_0}{2\pi}\frac{I}{d}$$

$$\mu_0 = \frac{B \cdot d}{I}\,2\pi$$

μ_0 = permeabilità magnetica nel vuoto

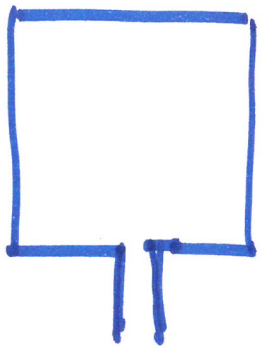
$$\mu_0 = 4\pi \cdot 10^{-7}\ \frac{Tm}{A}$$

SOLENOIDE

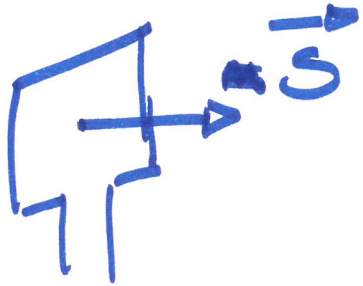


$$B = \mu_0 N \frac{I}{\ell}$$

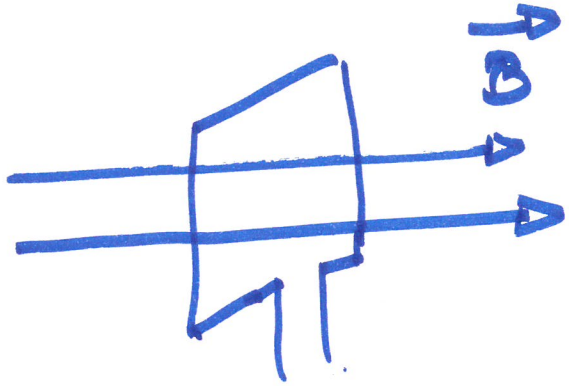
N = numero di spire



$$\Phi = \vec{S} \cdot \vec{B} = SB\cos\theta$$



$\vec{S}$ $\perp$ alla superficie
con modulo = S



$\theta = 0 \quad \cos\theta = 1$

$\Phi_{max} = SB$

$$V_\Delta = -\frac{d\Phi}{dt}$$

LEGGE di
FARADAY - LENZ

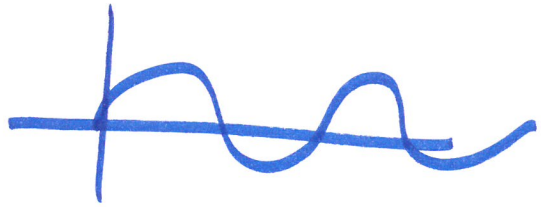
$\theta = \omega t$ ruota con ω costante

$$\phi = \vec{B} \cdot \vec{B} = S B \cos(\omega t)$$

ALTERNATORE = spira che ruota in B

$$V_\Delta = -\frac{d\phi}{dt} = +SB \sin(\omega t) \cdot \omega$$

$$V_\Delta = \underbrace{SB\omega} \sin(\omega t)$$



$$V_\Delta = V_0 \sin(\omega t)$$

$$V_0 = SB\omega$$

Se collego una resistenza $R = \frac{V_\Delta}{I}$

$$\longrightarrow I = \frac{V_\Delta}{R} = \overset{I_0}{\frac{V_0 \sin(\omega t)}{R}} = I_0 \sin(\omega t)$$