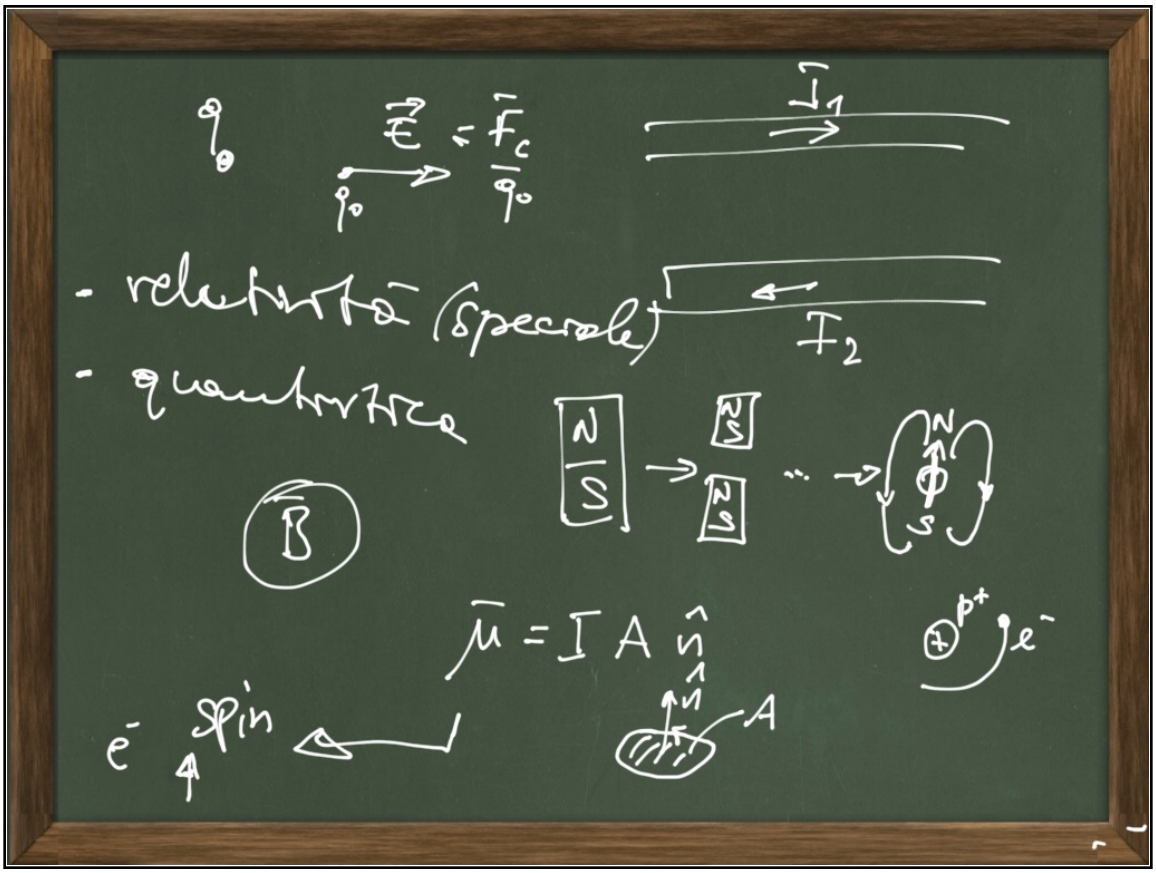
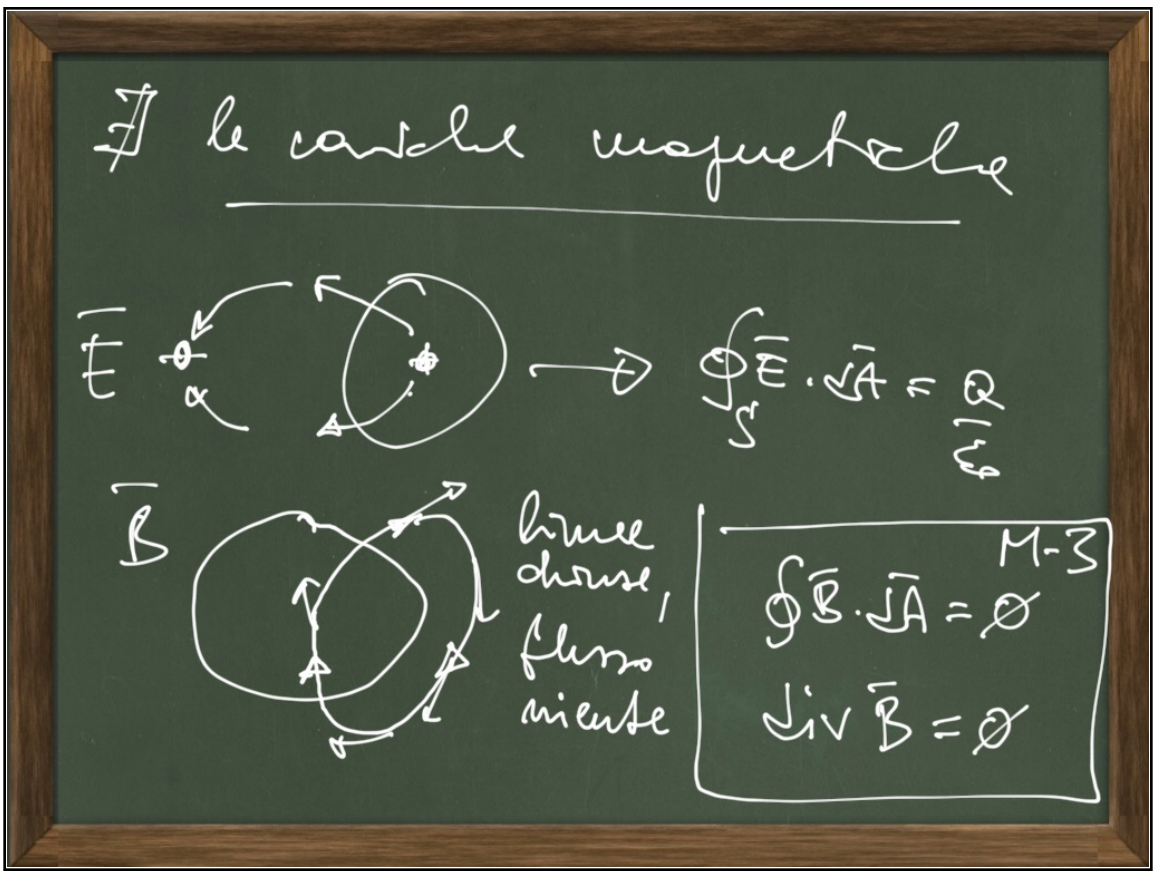
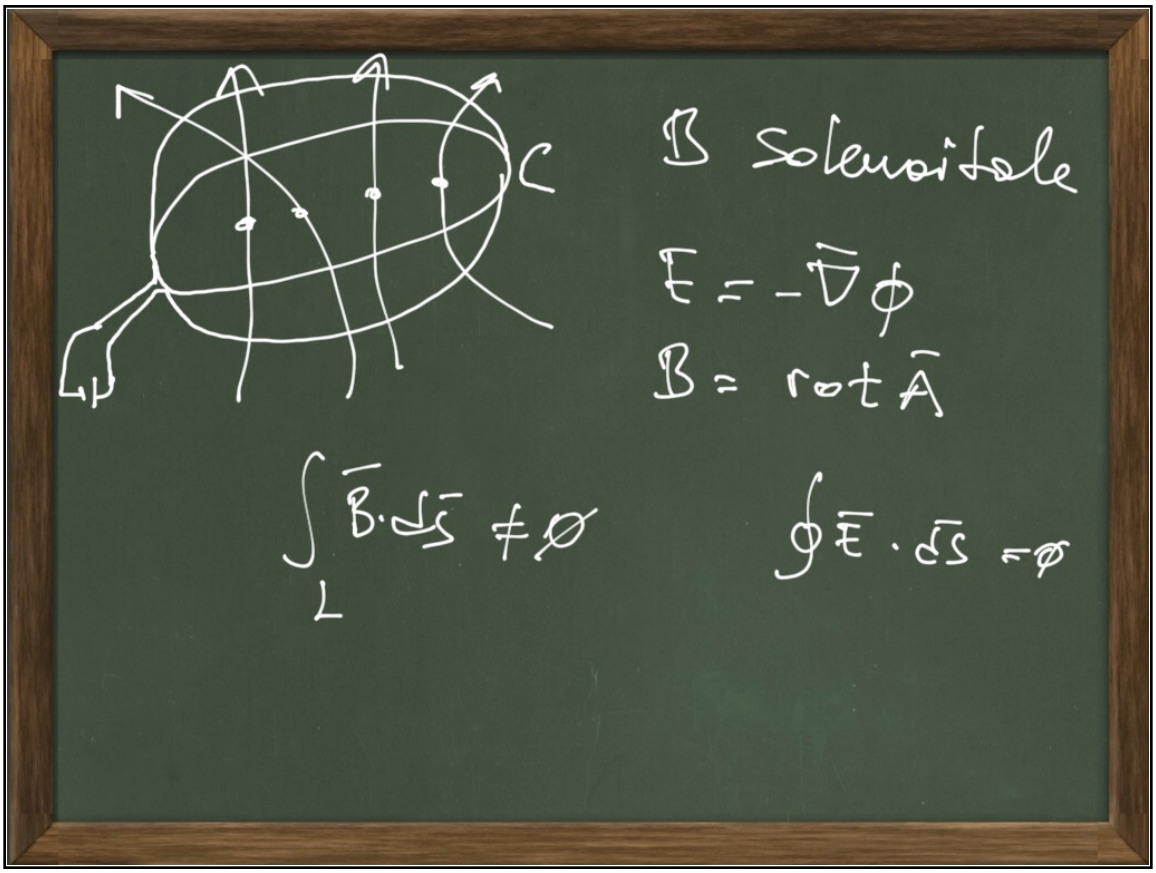
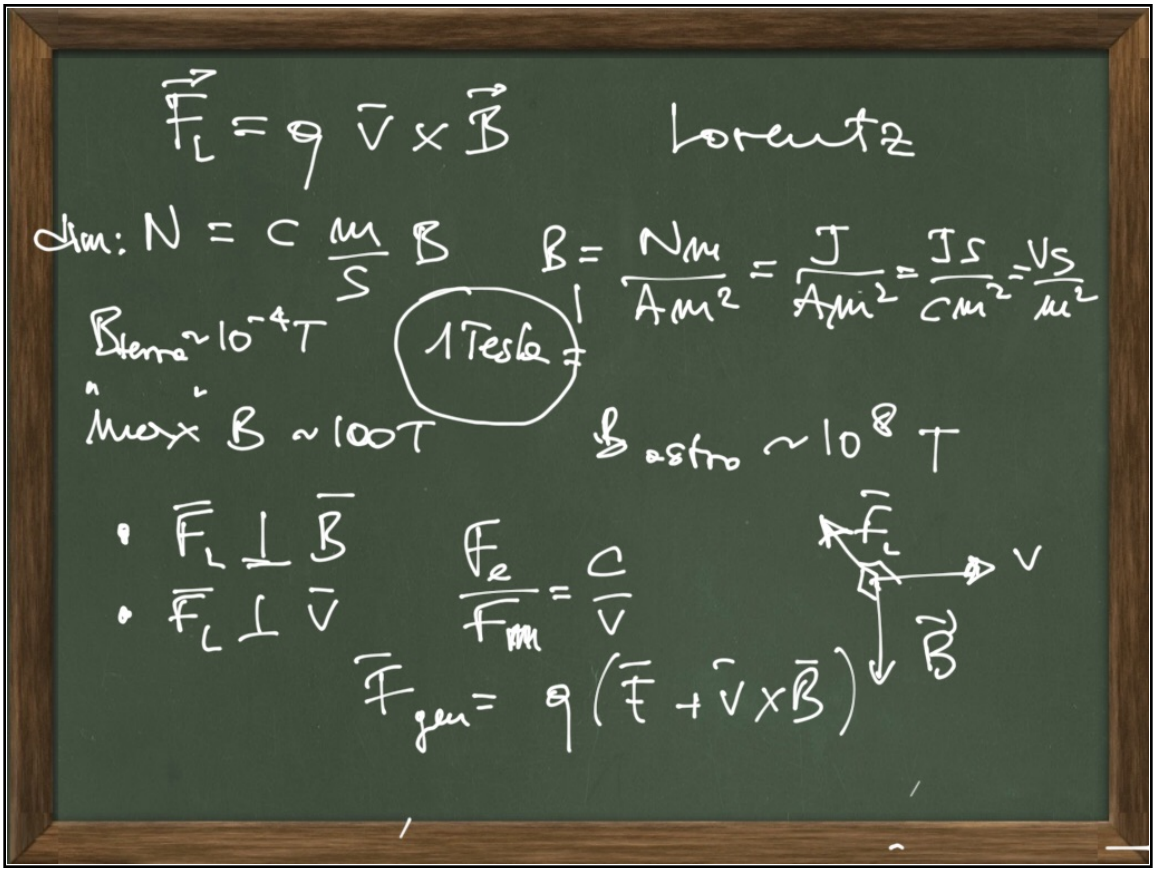

$\vec{E} = \frac{\vec{F}_c}{q_0}$
$\vec{I}_1$
$\vec{I}_2$
- relativistica (speciale)
- quantistica
N
S
B
$\vec{\mu} = I A \hat{n}$
spin
A
p^+
e^-


Il campo magnetico
$\vec{E}$
$\oint_S \vec{E} \cdot d\vec{A} = \frac{Q}{\varepsilon_0}$
$\vec{B}$
linee chiuse, flusso niente
M-3
$\oint \vec{B} \cdot d\vec{A} = 0$
$\mathrm{div}\, \vec{B} = 0$

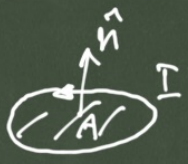

C
B solenoidale
$\bar{E} = -\bar{\nabla}\phi$
$\bar{B} = \text{rot}\,\bar{A}$
$\int_L \bar{B}\cdot d\bar{s} \neq 0$
$\oint \bar{E}\cdot d\bar{s} = 0$


$\vec{F}_L = q\,\vec{v}\times\vec{B}$ Lorentz
dim: $N = c\,\frac{m}{s}\,B$ $B = \frac{N_m}{Am^2} = \frac{J}{Am^2} = \frac{Js}{cm^2} = \frac{Vs}{m^2}$
$B_{terra} \sim 10^{-4}\,T$
1 Tesla
max B ~ 100 T
$B_{astro} \sim 10^8\,T$
• $\bar{F}_L \perp \bar{B}$
• $\bar{F}_L \perp \bar{v}$
$\frac{F_e}{F_m} = \frac{c}{v}$
$\bar{F}_{gen} = q(\bar{E} + \bar{v}\times\bar{B})$
$\bar{F}_L$
v
$\bar{B}$

$\bar{m} = I A \hat{n}$

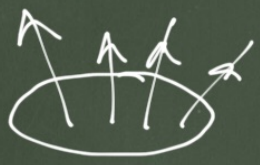
$[m] = A m^2 = \frac{J}{T}$

$[m][B] = J$



$U_p = -\bar{m} \cdot \bar{B}$

$\Phi = BA \overset{!}{=} \int_S \bar{B} \cdot d\bar{A}$



1 Weber = $1 T m^2$

flusso $\overset{!}{=} 1 Vs$

Moto circolare $\bar{B} \perp \bar{v}$

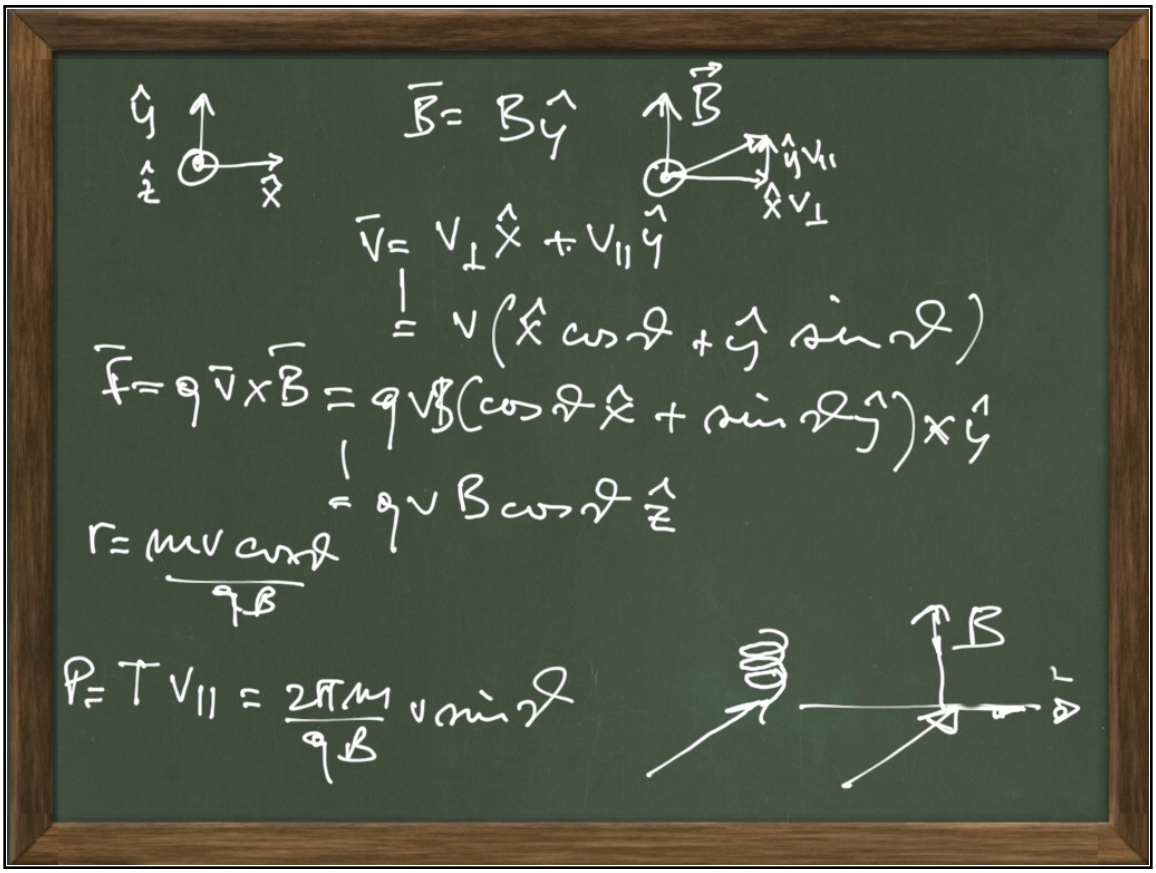
$f = qvB = ma = \frac{mv^2}{r}$ CICLOTRONE

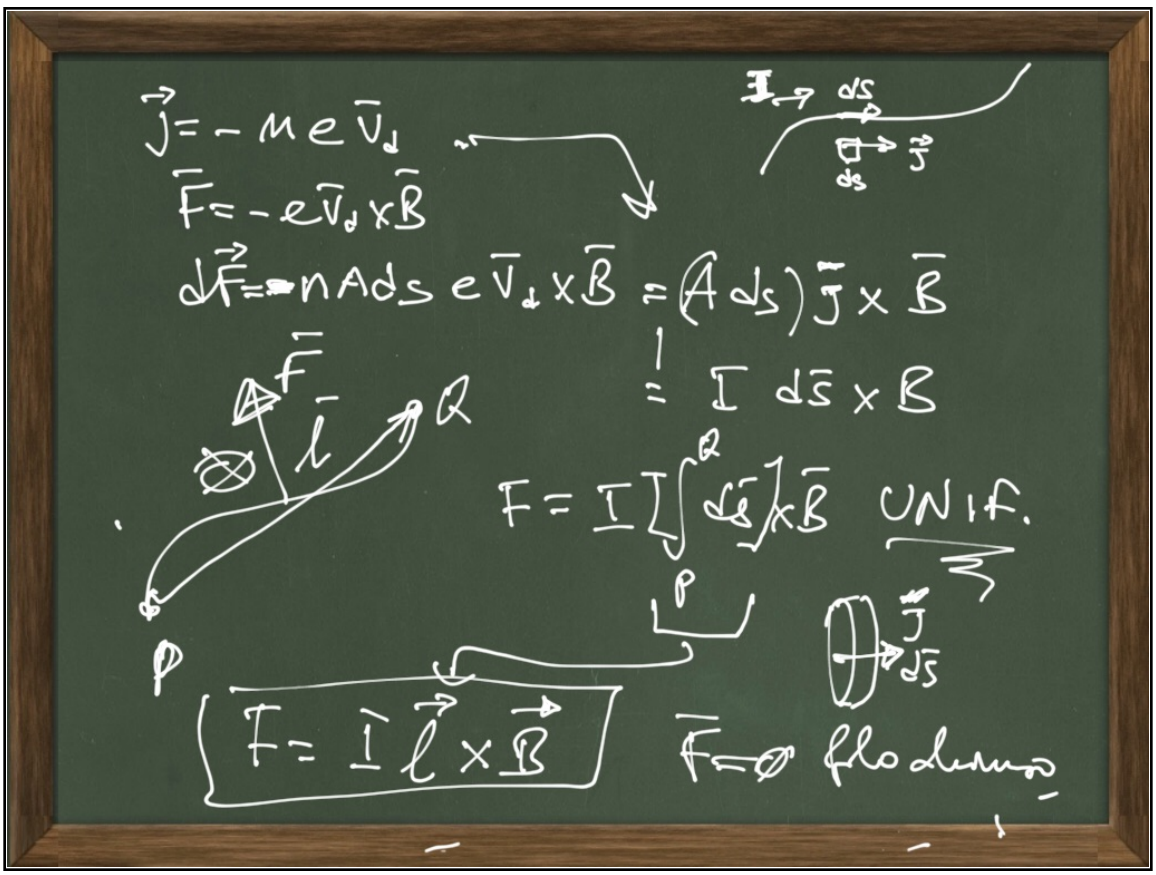
$r = \frac{mv}{qB}$ $\omega = 2\pi f = \frac{v}{r} = \frac{qB}{m}$

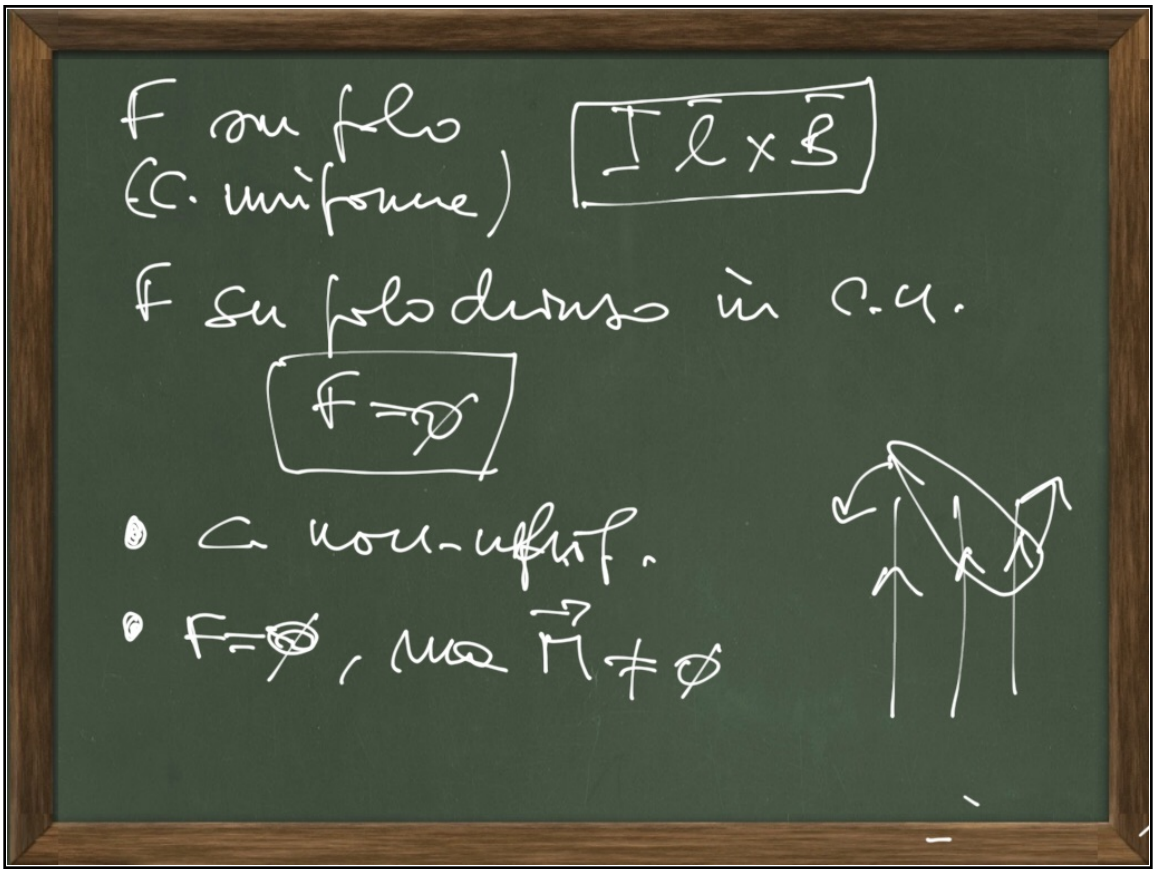
$T = \frac{2\pi m}{qB}$

$\vec{\omega} = -\frac{q}{m}\bar{B}$

$\bar{v} \times \bar{B} = \bar{\omega} \times \bar{v} = -\bar{v} \times \bar{\omega}$


$\vec{B} = B\hat{y}$
$\vec{v} = v_\perp \hat{x} + v_\parallel \hat{y}$
$= v(\hat{x}\cos\alpha + \hat{y}\sin\alpha)$
$\vec{F} = q\vec{v}\times\vec{B} = qvB(\cos\alpha\hat{x} + \sin\alpha\hat{y})\times\hat{y}$
$= qvB\cos\alpha\,\hat{z}$
$r = \frac{mv\cos\alpha}{qB}$
$P = T v_\parallel = \frac{2\pi m}{qB} v\sin\alpha$
B


$\vec{J} = -ne\vec{v}_d$
$\vec{F} = -e\vec{v}_d\times\vec{B}$
$d\vec{F} = nA\,ds\,e\vec{v}_d\times\vec{B} = (A\,ds)\vec{J}\times\vec{B}$
$= I\,d\vec{s}\times B$
$F = I\int_P^Q d\vec{s}\times\vec{B}$ UNIF.
$\vec{F} = I\vec{l}\times\vec{B}$
$\vec{F} = 0$ flodum


F su filo
(C. uniforme)
$\vec{F} = I\vec{l} \times \vec{B}$
F su filo chiuso in C.U.
$\vec{F} = \vec{0}$
• a non-uniforme.
• $\vec{F} = \vec{0}$, ma $\vec{M} \neq \vec{0}$