Verifica di Fisica

Pecciati

es 1

$i = 100\ A$

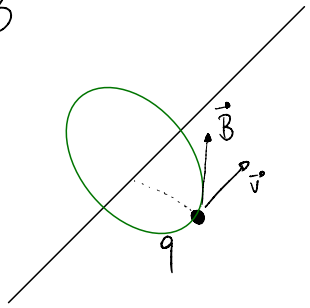
$q = +e$

$d = 5 \cdot 10^{-3}\ m$

$v = 150\ m/s$

$\vec{F} = q \cdot \vec{v} \wedge \vec{B}$

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



$$F = \frac{e \cdot v \cdot \mu_0 \cdot i}{2\pi d} = \frac{e \cdot 150\ m/s \cdot 100\ A \cdot \mu_0}{2\pi \cdot 5 \cdot 10^{-3}\ m} =$$

$$= 9{,}61 \cdot 10^{-20}\ N$$

ex 2

$q = 5 \cdot 10^{-5}\ C$

$m = 1 \cdot 10^{-5}\ kg$

$E = 350\ V/m$

$v_0 = 400\ m/s$

$v_f = 500\ m/s$

$d = ?$

$q \cdot E = m \cdot a$

$v_f^2 - v_0^2 = 2a \cdot d$

$$d = \frac{v_f^2 - v_0^2}{2a} = \frac{v_f^2 - v_0^2}{2qE} \cdot m$$

$$d = \frac{(500\ m/s)^2 - (400\ m/s)^2}{2 \cdot 5 \cdot 10^{-5} C \cdot 350\ V/m} \cdot 1 \cdot 10^{-5}\ kg = 25{,}71\ m$$

ex 3

$m = 2{,}5 \cdot 10^{-12}\ kg$

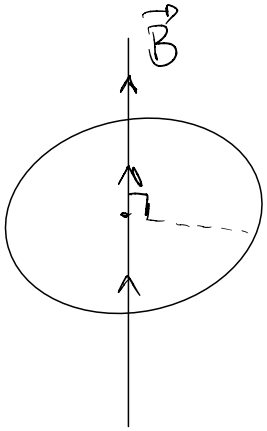
$q = 5{,}5 \cdot 10^{-9}\ C$

$r = 6{,}7 \cdot 10^{-2}\ m$

$K = 5{,}0\ MeV$

$\vec{B} = ?$

$f = ?$



$K = \frac{1}{2} m v^2$

$K = 5 \cdot 10^6\ eV = 8{,}012 \cdot 10^{-13}\ J$

$F = qvB = m\frac{v^2}{r}$ $\sim$ $B = \frac{mv^2}{qvr} = \frac{mv}{qr}$

$$v = \sqrt{\frac{2K}{m}} = \sqrt{\frac{2 \cdot 8{,}012 \cdot 10^{-13}\ J}{2{,}5 \cdot 10^{-12}\ kg}} = 0{,}8\ m/s$$

$$B = \frac{2{,}5 \cdot 10^{-12}\ kg \cdot 0{,}8\ m/s}{5{,}5 \cdot 10^{-9}\ C \cdot 6{,}7 \cdot 10^{-2}\ m} = 5{,}4 \cdot 10^{-3}\ T$$

$$f = \frac{1}{T} = \frac{v}{2\pi r} = \frac{0{,}8\ m/s}{2\pi \cdot 6{,}7 \cdot 10^{-2}} = 1{,}900\ Hz$$

ex 4

$q_A = q$ $\quad f_A = f$

$q_B = 2q$ $\quad f_B = ?$

$m_A = m_B = m$

$r_A = r_B = r$

$$f = \frac{v}{2\pi r} = \frac{qrB}{2\pi r m} \quad ; \quad f_B = \frac{2qrB}{2\pi r m} = 2 \cdot f$$

$f_B = 2f$

ex 5 In un campo magnetico il modulo della velocità di una particella carica rimane invariato