

Soluzione esercizio 1

a)

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

$$v = \frac{rq_\alpha B}{m_\alpha} = 2.59 \cdot 10^6 \frac{m}{s}$$

b)

$$\nu = \frac{\omega}{2\pi} = \frac{qB}{2\pi m} = 0.92 \cdot 10^6 s^{-1}$$

$$T = \frac{1}{\nu} = 110 ns$$

c)

$$k = \frac{1}{2}mv^2 = 2.24 \cdot 10^{-14} J$$

trasformiamo in eV

$$k = \frac{2.24 \cdot 10^{-14}}{1.6 \cdot 10^{-19}} eV = 1.4 \cdot 10^6 eV$$

d)

$$\Delta K = 2.24 \cdot 10^{-14} J$$

$$\Delta U = -\Delta K$$

$$\Delta V q = \frac{\Delta K}{q} = 7 \cdot 10^4 V$$

Soluzione esercizio 2

a)

$$|\vec{B}_1| = |\vec{B}_2| = |\vec{B}_3| = \frac{\mu_0 i}{2\pi d} = \frac{4\pi 10^{-7} \frac{Tm}{A} 10A}{2\pi 10 \cdot 10^{-2} m} = 2 \cdot 10^{-5} T$$

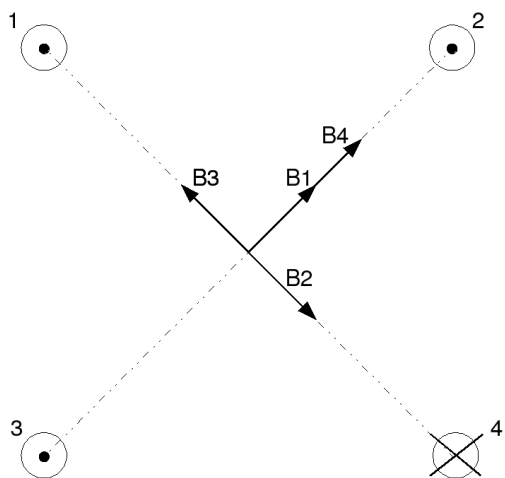
$$\vec{B}_3 + \vec{B}_2 = 0$$

$$|\vec{B}_4| = \frac{\mu_0 i_4}{2\pi d} = \frac{4\pi 10^{-7} \frac{Tm}{A} 20A}{2\pi 10 \cdot 10^{-2} m} = 4 \cdot 10^{-5} T$$

$$|B_{TOT}| = |\vec{B}_1| = |\vec{B}_4| = 6 \cdot 10^{-5} T$$

b)

$$|\vec{F}_1| = |\vec{F}_2| = |\vec{F}_3| = \frac{\mu_0 L i_1 i_5}{2\pi d} = L \frac{4\pi 10^{-7} \frac{Tm}{A} 10A \cdot 2A}{2\pi 10 \cdot 10^{-2} m} = L \cdot 4 \cdot 10^{-5} \frac{N}{m}$$



$$\vec{F}_2 + \vec{F}_3 = 0$$

$$|\vec{F}_4| = \frac{\mu_0 L i_4 i_3}{2\pi d} = L \cdot 8\pi 10^{-5} \frac{N}{m}$$

$$\frac{|F_{TOT}|}{L} = \frac{|\vec{F}_1|}{L} + \frac{|\vec{F}_4|}{L} = 12 \cdot 10^{-5} \frac{N}{m}$$

