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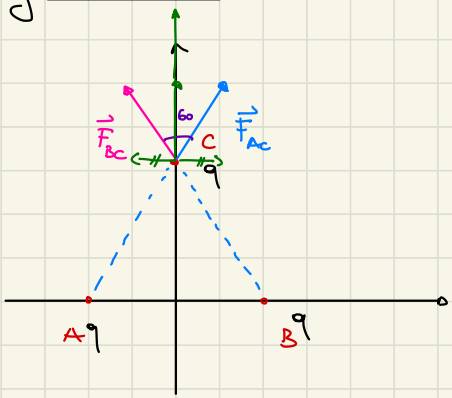

$m_A = m_B = m_C = m = 1g$

$AB = BC = CA = L = 1cm$

$q_A = q_B = q_C = q = 10nC$

Risultante

$$F_{AC} \cdot \cos 30° \cdot 2 = k_0 \cdot \frac{q^2}{L^2} \cdot \frac{\sqrt{3}}{2} \cdot 2 = \sqrt{3} k_0 \frac{q^2}{L^2} \approx$$

$$\sqrt{3} \cdot 9 \cdot 10^{9} \cdot \frac{10 \cdot 10^{-9} \cdot 10 \cdot 10^{-9}}{10^{-4}} N =$$

$$= 9\sqrt{3} \cdot 10^{-3} N = 15{,}6 \cdot 10^{-3} N \simeq 1{,}6 \cdot 10^{-2} N$$

La carica C è lasciata libera di muoversi

Determinare 1) direzione di spostamento (verticale)

2) v max raggiungibile ⇝ Si conserva l'energia di tutto il sistema

$$E_i = U_{AB} + U_{BC} + U_{CA}$$

$$E_\infty = U_{AB} + \frac{1}{2} m v^2$$

$\frac{1}{2} m v^2$ → cinetica di C

$E_i = E_\infty$ → En inizio = En a ∞

$$\frac{1}{2} m v^2 = \frac{q^2}{4\pi\varepsilon_0 L} + \frac{q^2}{4\pi\varepsilon_0 L} \quad \rightsquigarrow v^2 = \frac{q^2}{\pi\varepsilon_0 L m}$$

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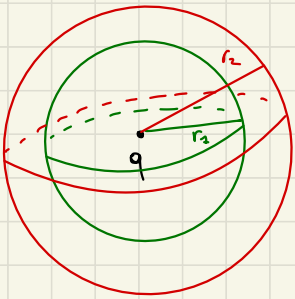

$q = 1{,}36 \cdot 10^{-9}\ C$

$r_2 - r_1 = 2{,}09\ cm$

$V_1 + V_2 = 807V$

$r_1, r_2 = ?$

lo conosco

$$V_1 = \frac{q}{4\pi\varepsilon_0 r_1} \qquad V_2 = \frac{q}{4\pi\varepsilon_0 r_2} \qquad V_1 + V_2 = \boxed{\frac{q}{4\pi\varepsilon_0}}\left(\frac{1}{r_1} + \frac{1}{r_2}\right) = 807$$

$$\begin{cases} r_2 - r_1 = 2{,}09 \\ \frac{1}{r_1} + \frac{1}{r_2} = 807 \cdot \frac{4\pi\varepsilon_0}{q} \end{cases}$$

ma si risolve

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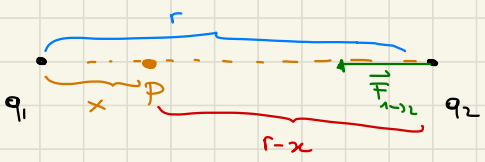

$q_1 = 3nC$ $\quad r = 4\ cm$

$q_2 = -5nC$

$F_{1\to 2} = ?$

Trova x in modo da $V(P) = 0$

$$F_{1\to 2} = k_0 \frac{|q_1||q_2|}{r^2}$$

$0 \le x \le r$

$$V(P) = \frac{q_1}{4\pi\varepsilon_0 x} + \frac{q_2}{4\pi\varepsilon_0 (r-x)} = 0$$

$$\frac{q_1}{x} + \frac{q_2}{r-x} = 0 \quad \Rightarrow \quad q_1(r-x) + q_2 x = 0$$

$$x(-q_1 + q_2) = -q_1 r \quad \Rightarrow \quad x = -\frac{q_1 r}{q_2 - q_1} \le r$$