C. E.

$Q > 0$

$q < 0$

Carga pontual Q

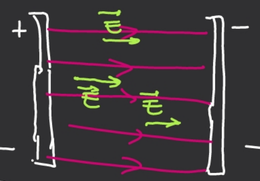
$$\vec{E} = K \frac{Q}{r^2} \vec{u}_r \quad \left(\frac{N}{C} = \frac{V}{m}\right)$$

Várias cargas

$$\vec{E} = \vec{E}_1 + \vec{E}_2 + \vec{E}_3 + \cdots$$

C. E uniforme:

$$\vec{E} = c\vec{te}$$



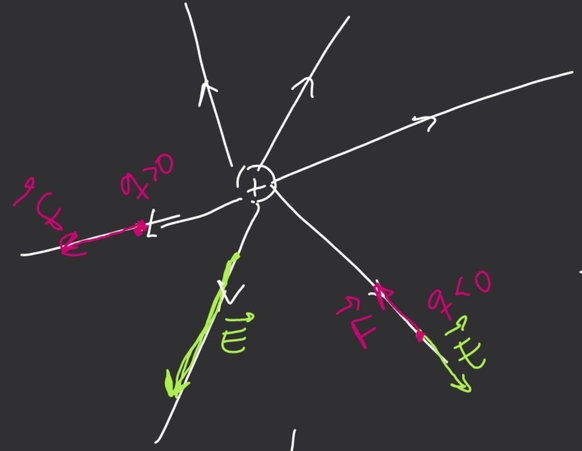
Sobre uma carga q:

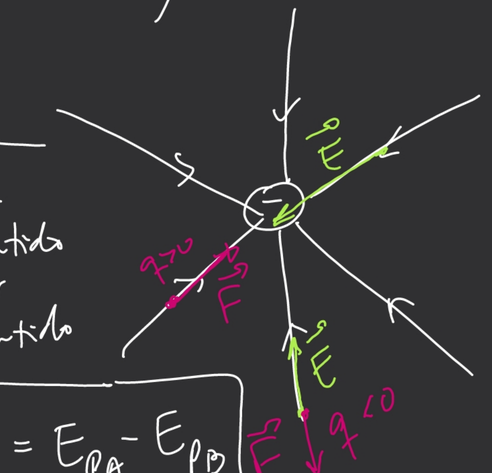
$$\vec{F} = q\vec{E}$$

(IV)

$q > 0 \Rightarrow \vec{F} \in \vec{E}$ | = dir = sentido

$q < 0 \Rightarrow \vec{F} \in \vec{E}$ | = dir ≠ sentido





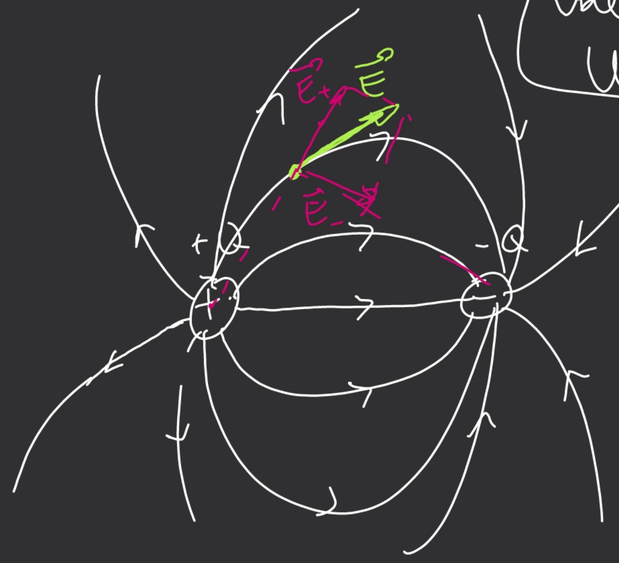
Linhas de Campo

- CE tgte à linha em cada ponto
- maior densidade de linhas significa maior intens. do CE

CE criado por:

1. carga pontual ou distrib. discreta
2. uniforme
3. distrib. contínua (arfar)

Vídeo CE
Universo Mecânico



dipolo elétrico

NS

CE conservativo $\Rightarrow W_{A \to B} = -\Delta E_p = E_{pA} - E_{pB}$

Q pontual: (V) $V(r) = K\frac{Q}{r}$ se $V(\infty) = 0$ origem de potenciais

$$E_p(r) = K\frac{Qq}{r}$$

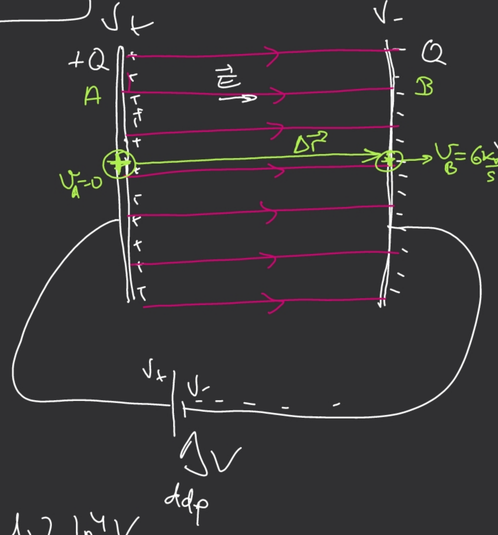
$W_{A \to B} = \Delta E_c \Rightarrow E_m = E_c + E_p = c\vec{te}$ (campo)

(J)

Relação CE uniforme e potencial: $\Delta V = -\vec{E} \cdot \Delta\vec{r}$

$|\Delta V| = E \cdot d$

GT 14



$E = 1,2 \cdot 10^4 \frac{V}{m}$

$\left(C = \varepsilon \frac{S}{d}, C = \frac{Q}{\Delta V} \right)$

↓ F

a/ 2 formes :

① Energie

$E_{mA} = E_{mB}$

$E_{cA} + E_{pA} = E_{cB} + E_{pB}$

$E_{cB} = E_{pA} - E_{pB}$

$E_{cB} = q_\alpha (V_A - V_B)$

$\frac{1}{2} m_\alpha v_B^2 = q_\alpha (V_A - V_B)$

Calcul ΔV :

$\Delta V = - \vec{E} \cdot \Delta \vec{r}$

$V_B - V_A = - E \cdot \overline{AB}$

$V_A - V_B = E \cdot \overline{AB}$

Substitution :

$\frac{1}{2} m_\alpha v_B^2 = q_\alpha E \cdot \overline{AB}$

$\overline{AB} = d = \frac{4 \cdot 1,6 \cdot 10^{-27} \cdot (6 \cdot 10^3)^2}{2 \cdot 2 \cdot 1,6 \cdot 10^{-19} \cdot 1,2 \cdot 10^4}$

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

b) $V_A - V_B = E \cdot d = 1,2 \cdot 10^4 \cdot 3 \cdot 10^{-5} =$

$= 0,36 V$

② Din + Cinem

$\vec{E}$ unif $\Rightarrow \vec{F}$ cte

$\vec{F} = q_\alpha \vec{E}$

$\vec{F} = m_\alpha \vec{a}$

$\Rightarrow \vec{a} = \frac{q_\alpha \vec{E}}{m_\alpha}$: cte

$a = \frac{2 \cdot 1,6 \cdot 10^{-19} \cdot 1,2 \cdot 10^4}{4 \cdot 1,6 \cdot 10^{-27}} = 6 \cdot 10^{11} \frac{m}{s^2}$

a cte ↳ MRUA rectiligne

Cin. :

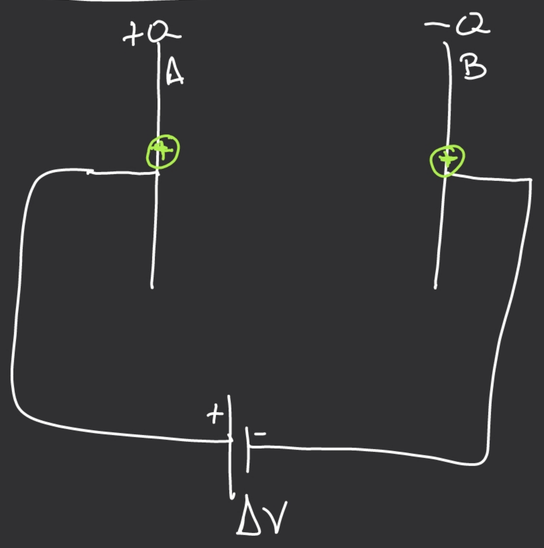
$v_B = v_A + a \cdot t$

$d = v_A \cdot t + \frac{1}{2} a \cdot t^2$

$v_B^2 = v_A^2 + 2 a \cdot d$

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

As placas dum...



$V_A > V_B$

$d = \overline{AB} = 0{,}01\ m$

$ddp = |\Delta V| = 2 \cdot 10^6\ V$

$v_A = 0$

a) $\Delta V = -\vec{E} \cdot \Delta\vec{r}$

$|\Delta V| = E \cdot d$

$E = \frac{|\Delta V|}{d} = \frac{2 \cdot 10^6}{0{,}01}$

$$E = 2 \cdot 10^8 \frac{V}{m}$$

b) $E_\alpha = E_{mA} = E_{mB}$

$E_{mA} = E_{cA} + E_{pA} = E_{pA} = q_\alpha \cdot |\Delta V|$

$E_\alpha = E_{mA} = 2 \cdot 1{,}6 \cdot 10^{-19} \cdot 2 \cdot 10^6 = \boxed{6{,}4 \cdot 10^{-13}\ J}$

c) $E_{mA} = E_{mB}$

$E_{mA} = E_{cB} + E_{pB} \Rightarrow 6{,}4 \cdot 10^{-13} = \frac{1}{2} 4 \cdot 1{,}6 \cdot 10^{-27} \cdot v_B^2$

$$v_B = 1{,}4 \cdot 10^7 \frac{m}{s}$$

Saindo pela armadura negativa

d) MRUA

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

$\vec{F} = m \cdot \vec{a}$

Movto retilíneo:

$F = qE = ma \Rightarrow a = \frac{qE}{m}$

$a = \frac{2 \cdot 1{,}6 \cdot 10^{-19} \cdot 2 \cdot 10^8}{4 \cdot 1{,}6 \cdot 10^{-27}} = \boxed{10^{16}\ \frac{m}{s^2}}$

$v_B = v_A + a \cdot t$

$t = \frac{v_B}{a} = \frac{1{,}4 \cdot 10^7}{10^{16}} = \boxed{1{,}4 \cdot 10^{-9}\ s}$

e)