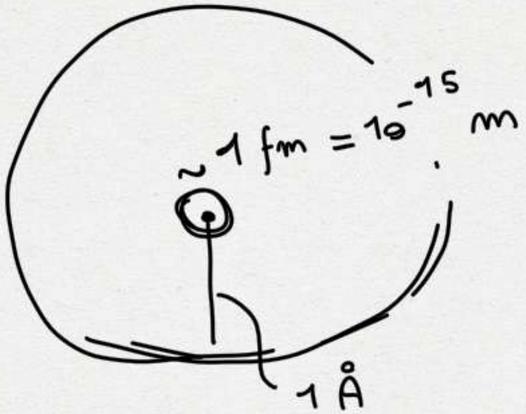
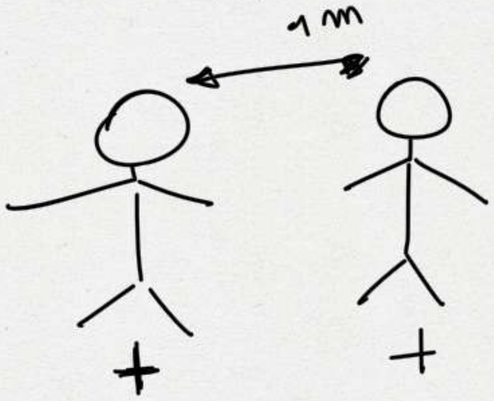
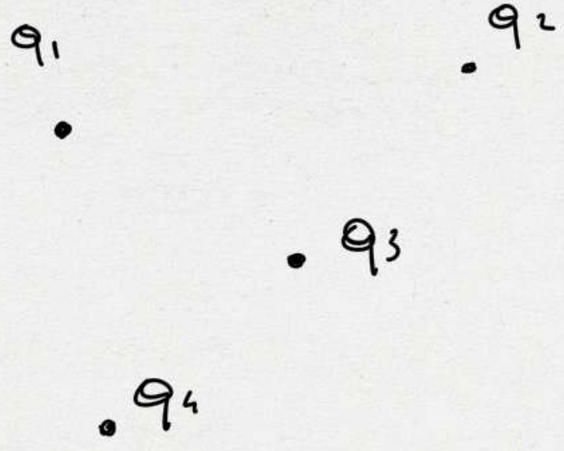
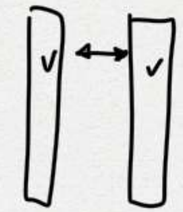
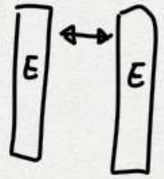
ELETTROSTATICA

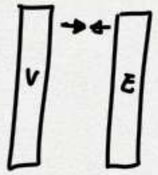












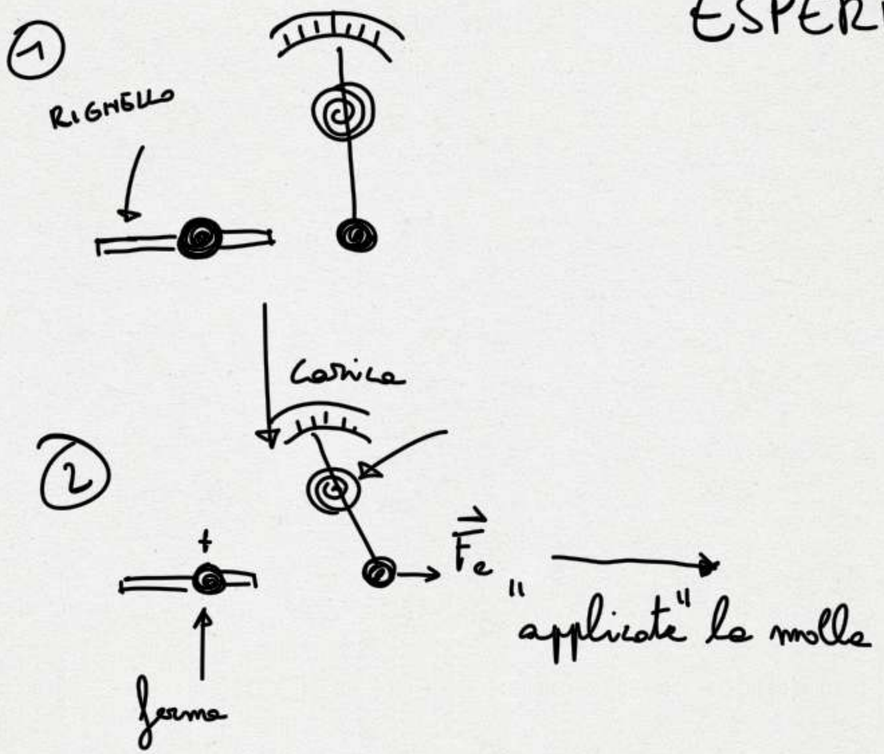
$|e| = q_e = q_p$, $\frac{|q_e - q_p|}{e} \sim 10^{-21}$,

$$\begin{cases} e = 1.6 \cdot 10^{-19}\ C \\ q \sim 10^{-7} \div 10^{-9}\ C \end{cases}$$

C VIENE DA $\boxed{A} = \frac{C}{s}$

$N_e \sim \frac{q}{e} \sim 10^{10} \ll N_A$, 10^{13} DIECIMILA MILIARDI

ESPERIMENTO DI COULOMB



$$\vec{F}_{TOT} = \vec{F}_M + \vec{F}_e = 0 \Rightarrow \quad \vec{F}_e = -\vec{F}_M$$

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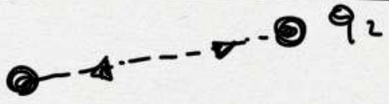
1) 

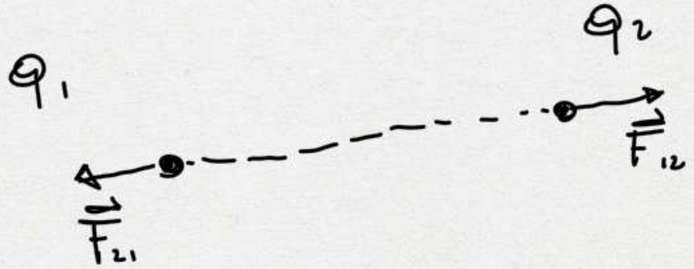
2) se $q_1 = q_2$, $F_{13} = F_{23}$

3) se $\vec{F}_{13} = -\vec{F}_{23} \Rightarrow |q_1| = |q_2|$, $q_1 = -q_2$

4) $F(r) \sim \frac{1}{r^2} \Rightarrow$

$$\vec{F}_{12}(\vec{r}) = K \frac{q_1 q_2}{r^2} \hat{r}$$ FORZA DI COULOMB

$q_1 = q_2$



$$\vec{F}_{12} = -\vec{F}_{21} \Rightarrow \vec{F}_{12} + \vec{F}_{21} = 0$$

$$\Downarrow$$

$$|\vec{F}_{12}| = |\vec{F}_{21}|$$

$[F] = N$, $[r] = m$, $[q] = C$

$$[F] = [K]\frac{[q]^2}{[r]^2} \Rightarrow N = [K]\frac{C^2}{m^2} \Rightarrow [K] = \frac{N m^2}{C^2}$$

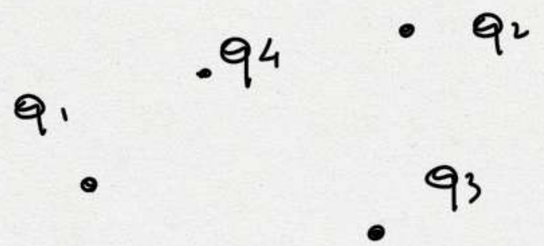
$$K = \frac{1}{4\pi\varepsilon_0}, \quad \varepsilon_0 = 8.854 \cdot 10^{-12} \frac{C^2}{N m^2}$$

$$R = \frac{F_G}{F_e} = \frac{G m_p m_e}{r^2} \frac{r^2}{K e^2} = \frac{G m_p m_e}{K e^2} \sim$$

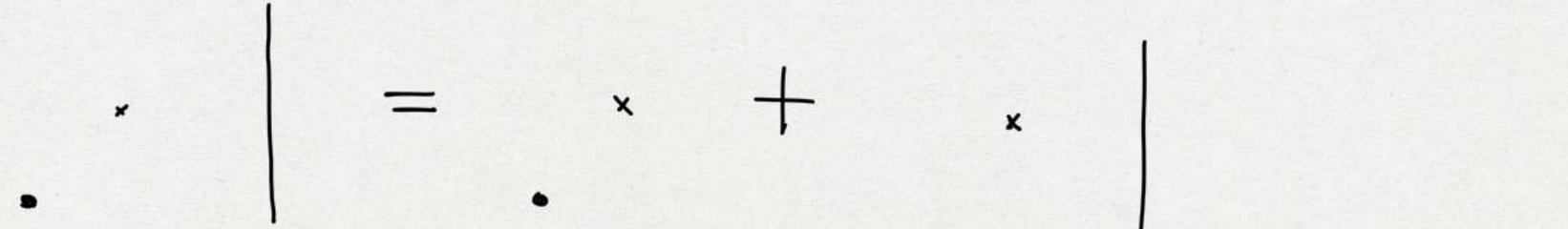
$\sim 10^{-40}$

$m, v \rightarrow$

PRINCIPIO DI SOVRAPPOSIZIONE



$$\vec{\vec{F}}_1 = \vec{\vec{F}}_{21} + \vec{\vec{F}}_{31} + \vec{\vec{F}}_{41} = \sum_{i=2}^{N} \vec{\vec{F}}_{i1} = \sum_{i=2}^{N} \frac{1}{4\pi\varepsilon_0} \frac{q_1 q_i}{r_{i1}^2} \hat{r}_{i1}$$

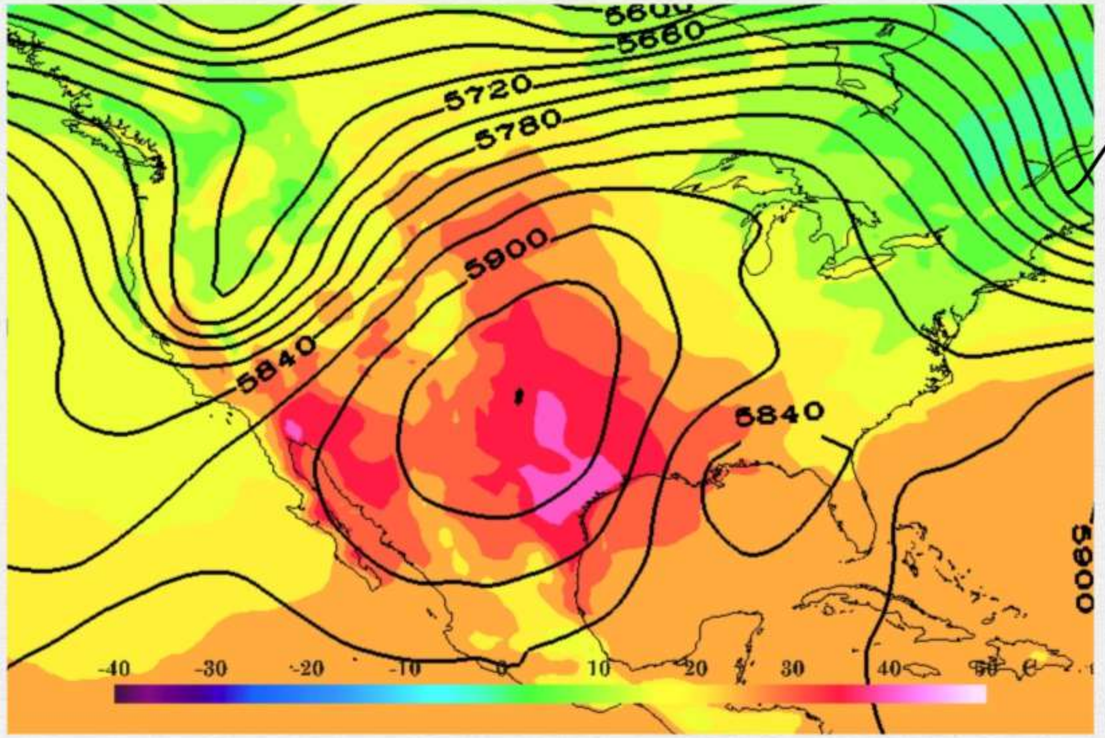


$$\vec{\vec{F}}_1 = \frac{q_1}{4\pi\varepsilon_0} \sum_{i=2}^{N} \frac{q_i}{r_{i1}^2} \hat{r}_{i1} \quad , \quad \vec{\vec{E}}(\vec{r}_1) \equiv \frac{\vec{\vec{F}}_1}{q_1} = \frac{1}{4\pi\varepsilon_0} \sum_{i=2}^{N} \frac{q_i}{r_{i1}^2} \hat{r}_{i1} \Rightarrow$$

$$\boxed{\vec{\vec{F}}_1 = q_1 \vec{\vec{E}}(\vec{r}_1)} \Rightarrow [E] = \frac{[F]}{[q]} = \frac{N}{C} = \frac{V}{m}$$

$\vec{E}$ è un campo vettoriale

$$\vec{E}(\vec{r}) = \vec{E}(x,y,z) = \left(E_x(x,y,z),\ E_y(x,y,z),\ E_z(x,y,z)\right)$$



$T(x,y)$

$\vec{V} = (V_x, V_y)$, $V_x(x,y) = x$, $V_y(x,y) = y$