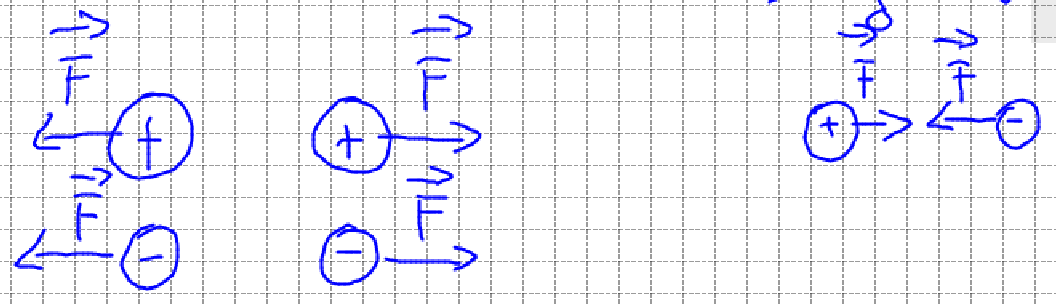
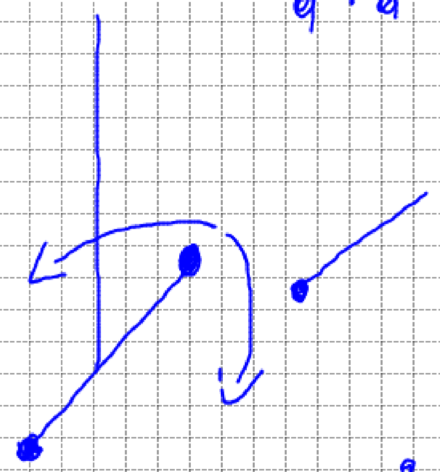
CARICHE ELETTRICHE

Due tipi di cariche → positiva (+) [VETRO]
→ negativa (-) [PLASTICA]



$$F_G = G\frac{m_1 m_2}{d^2} \qquad \vec{F}_G = G\frac{m_1 m_2}{d^2 \cdot \hat{d}} \qquad [N] = \left[\frac{kg^2}{m^2}\right]\left[\frac{N m^2}{kg^2}\right]$$

$$F_{ele} = K_{ele}\frac{Q_1 Q_2}{d^2} \qquad \vec{F}_{ele} = K_{ele}\frac{Q_1 Q_2}{d^2 \cdot \hat{d}} \qquad [N] = \left[\frac{C^2}{m^2}\right]\left[\frac{N m^2}{C^2}\right]$$



K_{ele} = costante di Coulomb $\simeq 9\times10^9 \frac{N}{C^2}m^2$

$K_{ele} = \frac{1}{4\pi\varepsilon_0}$ → ε_0 costante elettrostatica $\sim 8{,}85\times10^{-12}\frac{C^2}{N m^2}$

(carica elettrone) $q_e \simeq 1{,}6\times10^{-19}\,C \approx q_p$ (carica protone)

ε_0 = costante dielettrica nel vuoto

ε_r = costante dielettrica relativa al mezzo.

ε = costante dielettrica assoluta → $\varepsilon = \varepsilon_r \cdot \varepsilon_0$

$(\varepsilon_r)_{H_2O}$ = 80 volte più grande di ε_0 $\qquad (\varepsilon_r)_{H_2O} = \frac{\varepsilon}{\varepsilon_0} \rightarrow \varepsilon_0 = \frac{\varepsilon}{\varepsilon_{r\,H_2O}}$

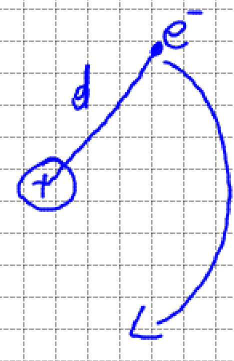
$$F_0 = \frac{1}{4\pi\varepsilon_0}\frac{Q_1 Q_2}{d^2} \qquad F_{r\,H_2O} = \frac{1}{4\pi\frac{\varepsilon}{\varepsilon_{r\,H_2O}}}\frac{Q_1 Q_2}{d^2}$$

$m_p = 1{,}67\times10^{-27}\,Kg.$

$m_e = 9{,}1\times10^{-31}\,Kg.$

- Consideriamo un atomo di idrogeno H_2.

$d = 50\,pm = 50\times10^{-12}\,m$ (pico $\sim 10^{-12}$)



$$\frac{F_{ele}}{F_G} = \frac{1}{4\pi\varepsilon_0}\frac{Q_e Q_p}{d^2}\cdot\frac{d^2}{G m_e m_p} = \qquad -38+81$$

$$= \frac{1}{4\pi\times8{,}85\times10^{-12}}\frac{1{,}6\times10^{-19}\times1{,}6\times10^{-19}}{6{,}67\times10^{-11}\times1{,}67\times10^{-27}\times9{,}1\times10^{-31}} = 2{,}3\times10^{39}$$

$$\frac{F_{ele}}{F_G} = 2{,}3\times10^{39}$$