

CV 1/1

$$Q_1 = 3,2 \cdot 10^6 \text{ C}$$

$$Q_2 = 5,4 \cdot 10^6 \text{ C}$$

$$r = 0,16 \text{ m}$$

$$|F| = k \cdot \frac{Q_1 \cdot Q_2}{r^2} = \frac{1}{4 \cdot \pi \cdot 8,85 \cdot 10^{-12}} \cdot \frac{3,2 \cdot 10^6 \cdot (5,4 \cdot 10^6)}{(0,16)^2} = \underline{\underline{6,07 \text{ N}}}$$

CV 1/4 $r = 10^{-13} \text{ m}$

$${}^4_2\text{He} \rightarrow m_x = 6,68 \cdot 10^{-27} \text{ kg}$$

$$Q_x = 3,2 \cdot 10^{-14} \text{ C}$$

$$F_a = k \cdot \frac{Q_x^2}{r^2} = \underline{\underline{0,092 \text{ N}}}$$

$$F_a = x F_g \rightarrow x = \frac{F_a}{F_g} = 3,08 \cdot 10^{35} \text{ větší než gravitační síla}$$

$$F_g = x \frac{m_x^2}{r^2} = \underline{\underline{2,98 \cdot 10^{-59} \text{ N}}}$$

CV 2/2

$$v_1 = 10000 \text{ m/s}$$

$$s = 0,16 \text{ m}$$

$$v_2 = x$$

$$E = 20 \text{ V/m}$$

$$e = 3 \cdot 10^{-31} \text{ m} \cdot \text{s}^{-1}$$

$$Q_e = 1,602 \cdot 10^{-19} \text{ C}$$

$$m_e = 9,1 \cdot 10^{-31}$$

$$F_e = Q \cdot E = 1,602 \cdot 10^{-19} \cdot 20 = 3,204 \cdot 10^{-18} \text{ N}$$

$$F = m \cdot a \rightarrow a = \frac{F}{m} = \dots = 3,5 \cdot 10^{12} \text{ m} \cdot \text{s}^{-2}$$

$$v_2 = at + v_0$$

$$\frac{v_2 - v_0}{a} = t$$

$$s = \frac{1}{2} at^2 + v_0 t$$

$$2s = a \left(\frac{v_2 - v_0}{a} \right)^2 + 2v_0 \left(\frac{v_2 - v_0}{a} \right)$$

$$2s = \frac{v_2^2 - 2v_2 v_0 + v_0^2}{a} + \frac{2v_0 v_2 - 2v_0^2}{a} \quad | \cdot a$$

$$2sa = v_2^2 - v_0^2$$

$$v_2 = \sqrt{2sa + v_0^2}$$

$$= \underline{\underline{1,06 \cdot 10^6 \text{ m} \cdot \text{s}^{-1}}}$$

$$v_2 = x c \rightarrow x = \frac{v_2}{c} = \frac{1,06 \cdot 10^6}{3 \cdot 10^8} = 3,5 \cdot 10^{-3} \text{ je tato rychlost menší než rychlost světla}$$