

I Champs électrique et magnétique

$$2. t = \frac{\ell}{v_0} = 1,2 \mu\text{s} = 1,2 \cdot 10^{-6} \text{ s}$$

$$3. y_S = \frac{-2eE}{2mv_0^2} \ell^2$$

$$\text{A.N. : } y_S = \frac{-2 \cdot 1,602 \cdot 10^{-19} \cdot 720}{2 \cdot 6,6447 \cdot 10^{-27} \cdot (100 \cdot 10^3)^2} \cdot 0,12^2 \text{ m} = -2,5 \text{ cm} = -0,025 \text{ m}$$

$$v_S = \sqrt{v_{Sx}^2 + v_{Sy}^2} = \sqrt{v_0^2 + \left(\frac{-qEt}{m}\right)^2} = 108 \text{ km/s} = 108 \cdot 10^3 \text{ m/s}$$

$$4. F_m = qv_0B = 2 \cdot 1,602 \cdot 10^{-19} \text{ C} \cdot 10^5 \text{ m/s} \cdot 48 \cdot 10^{-6} \text{ T} = 1,54 \cdot 10^{-18} \text{ N}$$

$$F_e = qE = 2 \cdot 1,602 \cdot 10^{-19} \text{ C} \cdot 720 \text{ V/m} = 2,31 \cdot 10^{-16} \text{ N}$$

$$F_e/F_m = 150$$

II Satellites

$$2. a = \frac{KM_L}{r_C^2}; \text{ A.N. : } a = \frac{6,673 \cdot 10^{-11} \cdot 318 \cdot 5,98 \cdot 10^{24}}{(1882709 \cdot 10^3)^2} = 3,58 \cdot 10^{-2} \text{ m/s}^2 = 0,0358 \text{ m/s}^2$$

$$v = \sqrt{\frac{KM_L}{r_C}}; \text{ A.N. : } v = \sqrt{\frac{6,673 \cdot 10^{-11} \cdot 318 \cdot 5,98 \cdot 10^{24}}{1882709 \cdot 10^3}} \text{ m/s} = 8,21 \text{ km/s} = 8210 \text{ m/s}$$

$$3. \frac{T_G}{T_E} = \frac{r_G^{3/2}}{r_E^{3/2}} = 2; \frac{T_G}{T_I} = \frac{r_G^{3/2}}{r_I^{3/2}} = 4$$

III Ondes

$$2. c = \lambda \cdot f = 1 \text{ m} \cdot 5 \text{ Hz} = 5 \text{ m/s}$$

$$v_{\text{max}} = 2\pi f y_{\text{max}} = \pi \text{ m/s}$$

4. Puisque $f \sim \sqrt{F}$, il faut diminuer la tension.

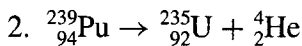
IV Effet photoélectrique

$$1. E_c = E - W_s = \frac{hc}{\lambda} - W_s = \frac{1}{2}mv^2 \implies v = \sqrt{\frac{2}{m} \left(\frac{hc}{\lambda} - W_s\right)}$$

$$\text{A.N. : } v = \sqrt{\frac{2}{9,1094 \cdot 10^{-31}} \left(\frac{6,626 \cdot 10^{-34} \cdot 2,998 \cdot 10^8}{400 \cdot 10^{-9}} - 2,25 \cdot 1,602 \cdot 10^{-19}\right)} \text{ m/s} = 547 \text{ km/s} = 547000 \text{ m/s}$$

$$2. P = \frac{N_\gamma hf}{t} = \frac{N_\gamma hc}{\lambda t} \iff N_\gamma = \frac{P \lambda t}{hc}$$

$$N_e = 20\% N_\gamma = 0,2 \cdot \frac{10^{-3} \cdot 400 \cdot 10^{-9} \cdot 1}{6,626 \cdot 10^{-34} \cdot 2,998 \cdot 10^8} = 4,03 \cdot 10^{14} \text{ électrons}$$

V Physique nucléaire

$$3a) E = E_\ell(\text{produits}) - E_\ell(\text{réactifs})$$

$$= 98 \cdot 8,581507 \text{ MeV} + 139 \cdot 8,311590 \text{ MeV} - 239 \cdot 7,560310 \text{ MeV}$$

$$E = 189,4 \text{ MeV}$$

$$3b) \gamma = 1 + \frac{E_c}{m_n c^2} = 1 + \frac{15}{939,57} = 1,0160$$

$$v = \sqrt{1 - \frac{1}{\gamma^2}} \cdot c = 0,1766c = 5,30 \cdot 10^7 \text{ m/s}$$