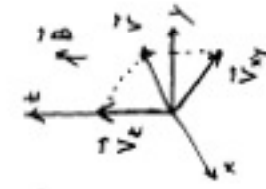


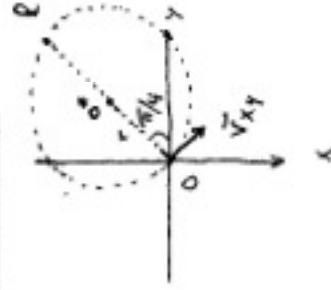
4.16.



le mouvement est circulaire !

- MCU dans le plan (xy)
- PRU dans le domaine (z)

i). Plan (xy)



$$\vec{v}_{xy} = (324; 324; 0) \text{ (m/s)} \quad v_{xy} = \sqrt{2 \cdot (324)^2} = 324\sqrt{2}$$

$$\begin{aligned} \cdot T &= \frac{2\pi r}{v_{xy}} \\ \cdot r &= \frac{mv_{xy}}{qB} \end{aligned} \Rightarrow T = \frac{2\pi m v_{xy}}{qB v_{xy}} = \frac{2\pi m}{qB} \approx 2,032 \cdot 10^{-8} \text{ s} \quad (A)$$

Après un temps $t = 5,13 \text{ ns}$, le nombre de tours effectués est $n = \frac{t}{T} \approx 2,5$

⇒ la particule a tourné $n = 2,5$ fois (c'est-à-dire $2,5 \cdot 2\pi$)

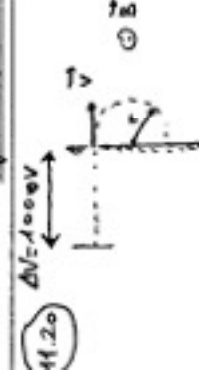
$$y_0 = 2r \cos 45^\circ = 2 \cdot \frac{mv_{xy}}{qB} \cos 45^\circ = 2 \cdot \frac{3,62 \cdot 10^{-10} \cdot 324\sqrt{2}}{4,38 \cdot 10^{-6} \cdot 0,25} \cdot \frac{\sqrt{2}}{2} \approx 0,21 \text{ m}$$

$$\Rightarrow P(-0,21; +0,21; 0)$$

ii). direction (oz)

$$V_z = 21 \text{ m/s} \Rightarrow z = 324 \cdot t \approx 1,67 \text{ m}$$

$$\Rightarrow \vec{r}_f = (-0,21; 0,21; 1,67) \text{ (m)}$$



ii). direction de la vitesse :

$$\frac{1}{2} m v^2 = q \cdot \Delta V$$

$$q = 3,2 \cdot 10^{-19} \text{ C}$$

$$m = 3,27 \cdot 10^{-15} \text{ kg}$$

$$\Rightarrow v = \sqrt{\frac{2q\Delta V}{m}}$$

iii). Calculer r : $r = \frac{mv}{qB}$ (formule du rayon)

$$r = \frac{m}{qB} \sqrt{\frac{2q\Delta V}{m}} = \frac{1}{B} \sqrt{\frac{2q\Delta V}{q}} = \frac{1}{B} \sqrt{2 \frac{m\Delta V}{q}} \approx 9,04 \cdot 10^{-2} \text{ m}$$



$$\cdot r = \frac{mv}{qB} = \frac{1}{B} \sqrt{2 \frac{m\Delta V}{q}} ; \quad m = 3,27 \cdot 10^{-15} \text{ kg} ; \quad \Delta V = 21,99 \text{ A} \cdot \text{m}$$

$$m_{\text{pro}} = 1,67 \cdot 10^{-27} \text{ kg}$$

• Déterminer la direction de la vitesse :

$$\begin{aligned} a). \Delta r &= \frac{r_{32} - r_{20}}{r_{20}} \cdot 100 = \frac{\frac{1}{B} \sqrt{2 \frac{m_{32} \Delta V}{q}} - \frac{1}{B} \sqrt{2 \frac{m_{20} \Delta V}{q}}}{\frac{1}{B} \sqrt{2 \frac{m_{20} \Delta V}{q}}} \cdot 100 = \frac{\sqrt{m_{32}} - \sqrt{m_{20}}}{\sqrt{m_{20}}} \cdot 100 \\ &= \frac{\sqrt{18,992} - \sqrt{12,992}}{\sqrt{12,992}} \cdot 100 \approx 4,9\% \text{ augmentation} \end{aligned}$$

$$\begin{aligned} b). \Delta r &= \frac{r_{32}^+ - r_{20}^+}{r_{20}^+} \cdot 100 = \frac{\frac{1}{B} \sqrt{2 \frac{m_{32} \Delta V}{q}} - \frac{1}{B} \sqrt{2 \frac{m_{20} \Delta V}{q}}}{\frac{1}{B} \sqrt{2 \frac{m_{20} \Delta V}{q}}} \cdot 100 = \frac{\sqrt{m_{32}} - \sqrt{m_{20}}}{\sqrt{m_{20}}} \cdot 100 \\ &= \frac{\sqrt{18,992} - \sqrt{12,992}}{\sqrt{12,992}} \cdot 100 \approx -25,8\% \end{aligned}$$

diminution