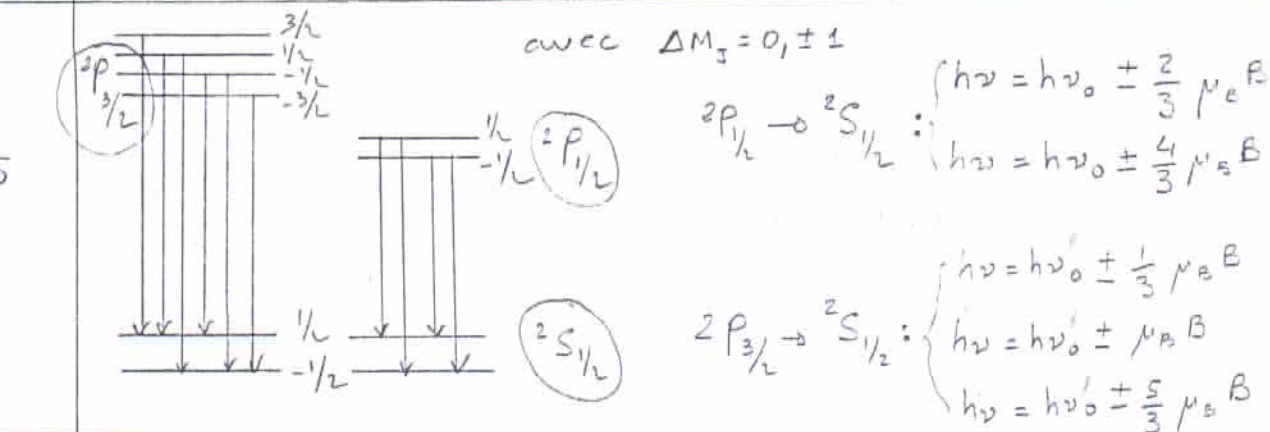
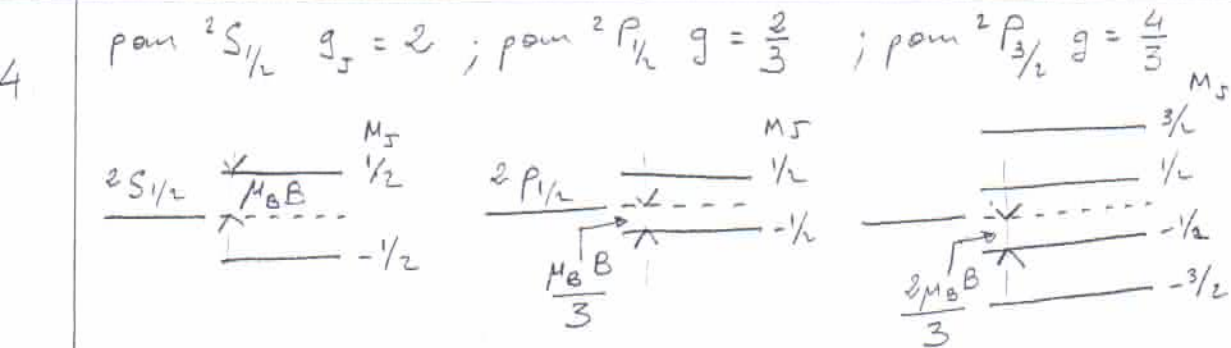


1 $1s^2 2s^2 2p^6 3s \rightarrow 2S_{1/2} \quad 1s^2 2s^2 2p^6 3p \rightarrow 2P_{1/2}$
 $\rightarrow 2P_{3/2}$

2 $(2P_{3/2} - 2S_{1/2}) - (2P_{1/2} - 2S_{1/2}) = \frac{hc}{\lambda_1} - \frac{hc}{\lambda_2} \approx 3,43 \cdot 10^{-22} \text{ J} (2,14 \text{ meV})$
 écart dû à l'interaction spin-orbite (ou structure fine).

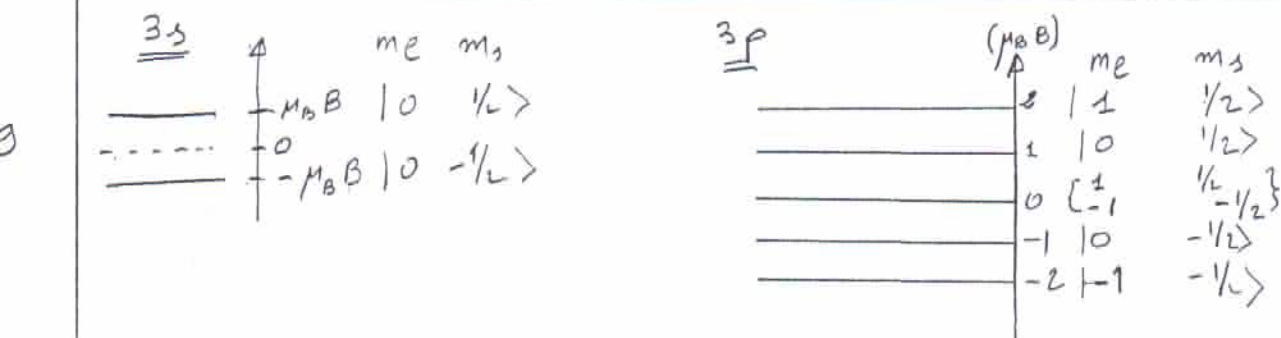
3 "champ faible" $\Leftrightarrow \Delta E_{SF} \gg \Delta E_{\text{Zeeman}}$; pour 1 T $\mu_B B = 9,27 \cdot 10^{-24} \text{ J}$ petit devant $(2P_{3/2} - 2P_{1/2})$.

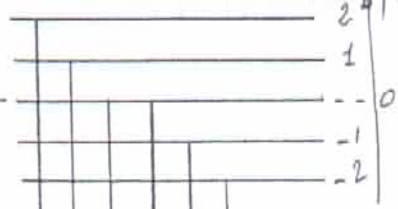


6 "champ fort" si Zeeman \gg S.F. $\Rightarrow \mu_B B \gg 3,43 \cdot 10^{-22} \text{ J} \Rightarrow B \gg 37 \text{ T}$

7 Il faut traiter d'abord action de Zeeman, puis celle de structure fine.
 Base à utiliser : $|n, l, m_l, m_s\rangle : |3, 0, 0, \pm \frac{1}{2}\rangle; |3, 1, 1, \pm \frac{1}{2}\rangle; |3, 1, 0, \pm \frac{1}{2}\rangle; |3, 1, -1, \pm \frac{1}{2}\rangle$

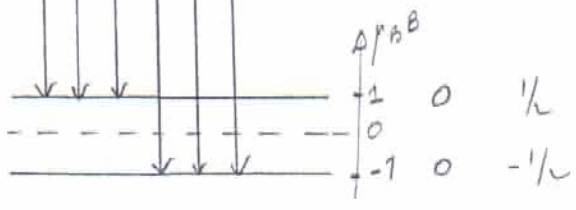
8 W_Z diag. dans $|n, l, m_l, m_s\rangle \Rightarrow \Delta E_Z = \mu_B B (m_l + 2m_s)$





$$\begin{pmatrix} 1 & 1/2 \\ 0 & 1/2 \\ -1 & -1/2 \\ 0 & -1/2 \\ -1 & -1/2 \end{pmatrix}$$

Dans le cadre de cette approximation 6 transitions mais seulement 3 longueurs d'onde différentes.



Après

$$\begin{pmatrix} 1 & 0 & 1/2 \\ 0 & 0 & -1/2 \\ -1 & 0 & -1/2 \end{pmatrix}$$