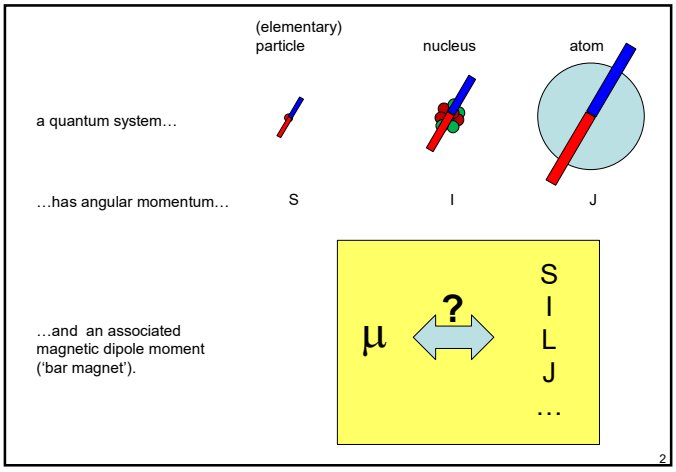
g-factor (bis)

www. hyperfinecourse .org

1



2

Wikipedia :

A ***g*-factor** (also called ***g* value** or **dimensionless magnetic moment**) is :

a dimensionless quantity which characterizes the magnetic moment of a particle or nucleus.

It is essentially a proportionality constant that relates the observed magnetic moment μ of a particle to the appropriate angular momentum quantum number and the appropriate fundamental quantum unit of magnetism, usually the Bohr magneton or nuclear magneton.

$$\mu_B = \frac{e\hbar}{2m_e} = 9.2741 \cdot 10^{-24} \frac{J}{T}$$
$$\mu_N = \frac{e\hbar}{2m_p} = 5.0508 \cdot 10^{-27} \frac{J}{T}$$

3

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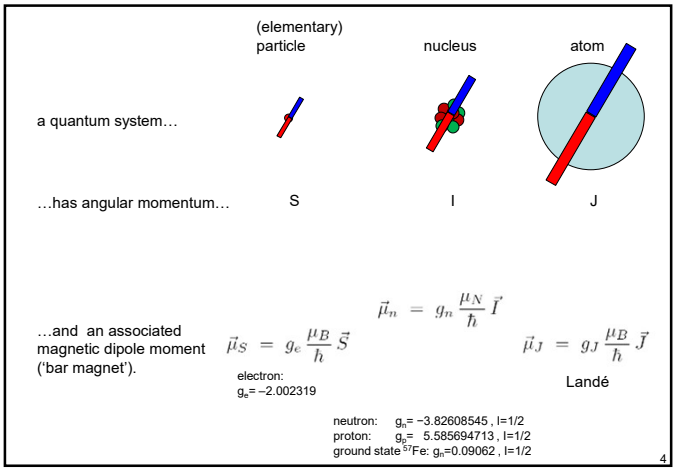

4

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$$\vec{\mu}_J = g_J \frac{\mu_B}{\hbar} \vec{J}$$

$$g_J = g_L \frac{J(J+1) - S(S+1) + L(L+1)}{2J(J+1)} + g_S \frac{J(J+1) + S(S+1) - L(L+1)}{2J(J+1)}$$

($g_S = -g_e = 2$)

$$\vec{\mu}_L = g_L \frac{\mu_B}{\hbar} \vec{L} \qquad (g_L = 1)$$

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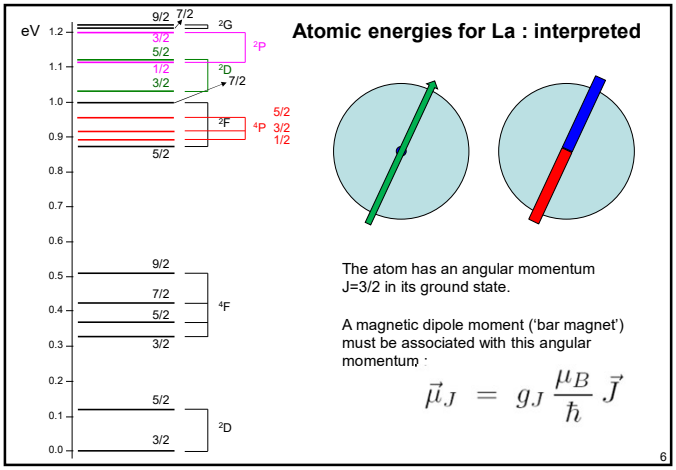

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