Magnetogyric ratio and nuclear magneton

The magnetogyric ratio is γ where $\gamma\hbar = g_I \mu_N$
The nuclear g-factor ranges from ca. -10 to 10.
Typical g-factors ^{1}H g=5.585, ^{13}C g=1.405 ^{14}N g=0.404
The nuclear magneton is μ_N where

$$\mu_N = \frac{e\hbar}{2m_p} = 5.05\ x\ 10^{-27}\ J/T$$

Nuclear magnetic moments are about 2000 times smaller than the electron spin magnetic moment because μ_N is 2000 times smaller than the Bohr magneton.

The Larmor frequency

- Application of magnetic field, B to a spin-1/2 system splits the energy levels.
- $E_{m_I} = -\mu_I B = -\gamma m_I \hbar B$
- The energy can also be expressed as $E_{m_I} = -m_I h\nu_L$ in terms of the Larmor frequency ν_L, which is the precession frequency of the spins

$$\nu_L = \frac{\gamma B}{2\pi}$$

- For spin 1/2 nuclei the resonance condition is $\Delta E_{\pm 1/2} = h\nu_L$