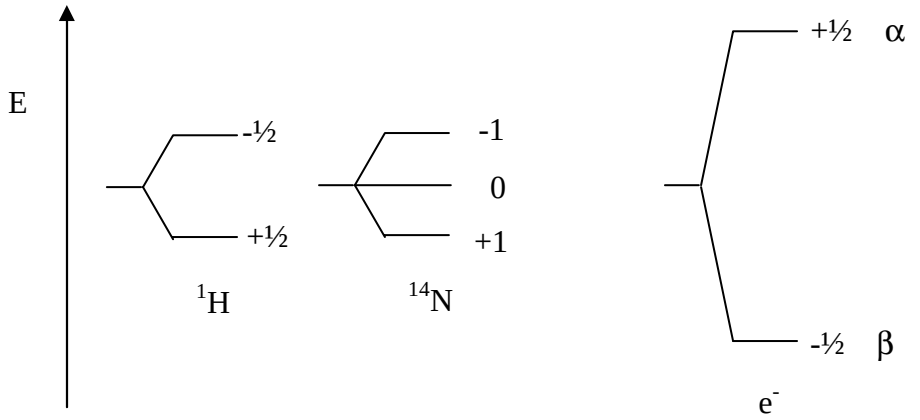
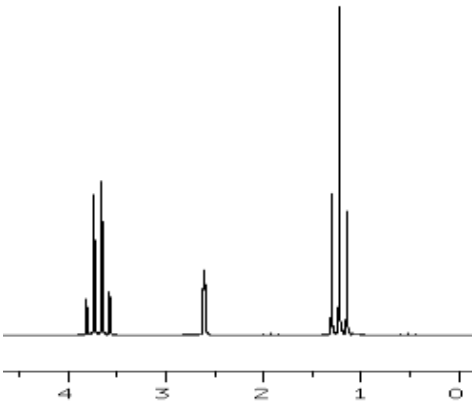
Electron Spin Resonance

property	NMR, I	ESR, s=½
angular momentum	$\|I\| = \hbar\sqrt{I(I+1)}$	$\|S\| = \hbar\sqrt{½(½+1)}$
magnetic moment	$\|\mu\| = \gamma_N \hbar\sqrt{I(I+1)}$	$\|\mu_e\| = \gamma_e \hbar\sqrt{½(½+1)}$
projection on z-axis	$\mu_z = \gamma_N \hbar M_I$	$\mu_z = \gamma_e \hbar M_s$
	$\mu_z = g_N \mu_N M_I$	$\mu_z = g_e \mu_B M_s$
nuclear or Bohr magneton	$\mu_N = \frac{e\hbar}{2 m_p}$ for ^1H	$\mu_B = \frac{-e\hbar}{2 m_e} \approx 2000\ \mu_N$
energy $E = -\vec{\mu}\cdot\vec{B}_o = -\mu_z B_o$	$E = -\gamma_N \hbar B_o M_I$	$E = g_e \mu_B B_o M_s$
chemical shift	$\Delta E = \gamma_N \hbar B_o (1-\sigma)$	$\Delta E = g \mu_B B_o$
		g = g-factor ≈ 2

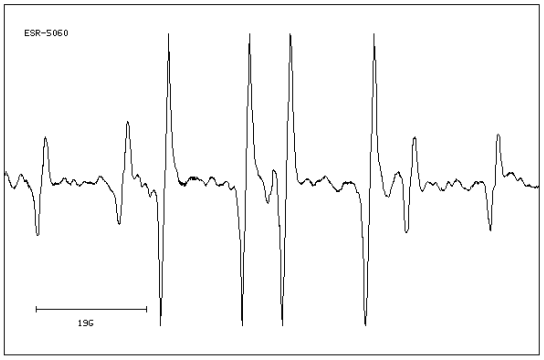


(in a much weaker field)

Ethanol
Many chemical shifts with fine structure



1-Ethoxyradical
One chemical shift with fine structure



http://www.aist.go.jp/RIODB/SDBS/