Lec 5 – 30 Sept 2014

Review HW#3

digitization – this lecture…. DW=1/(2SW) AQ = TDxDW AQ=TD/(2SW)

natural linewidths → $\nu_{FWHM} = 1/\pi T_2 \approx 1/\pi T_1(2SW)$

convolutions → truncation artifact convolutes into all peaks

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Questions HW#4

calendars

probes → BBFO vs Prodigy

analog vs digital filters

13C NMR: noe and PT → signal-to-noise

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$$s/n \propto c \cdot \gamma_{ext} \cdot \gamma_{obs}^{3/2} \cdot B_0^{3/2} \cdot \sqrt{t} \; / \; T$$ (Claridge section 4.4)

s/n = signal to noise

c = concentration of nuclei (including nat. abundance)

γ_{ext} = magnetogyric ratio of excitation nucleus

γ_{obs} = magnetogyric ratio of observed nucleus

B_0 = magnetic field strength

t = time of experiment, usually $\propto$ NS

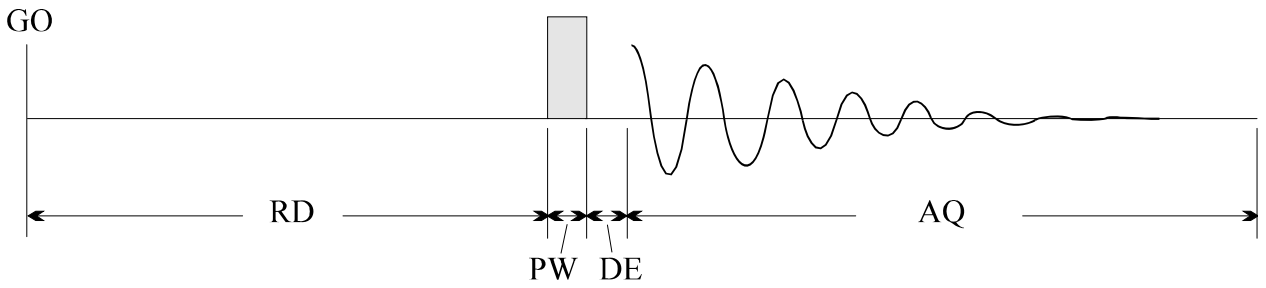
signal $\propto$ t

noise $\propto \sqrt{t}$

s/n $\propto$ signal / noise = $t/\sqrt{t} = \sqrt{t}$

T = temperature (K)

The One-Pulse NMR Experiment



1. **RD [D1] ≡ relaxation delay, regrow M_Z** [Clar 2.4.1]
2. **PW ≡ rf pulse of length PW μs nutate M into xy plane** [Clar 2.2.2]
3. **DE ≡ probe deadtime delay (μs) → wait for rf pulse to ringdown**
4. **AQ ≡ acquisition of TD points at DW dwell [= 1/(2SW)]** [Clar 3.2.3]
   a) **rotating frame → demodulation**
   b) **Nyquist**
   c) **phase behavior**
   d) **resolution and apodization**
5. **repeat DS + NS times**