

Experiment G-7b

Pulsed Nuclear Magnetic Resonance (computer-controlled)

1. Set up equipment to obtain (using program "Intercom") a $\pi/2$ pulse and observe the free induction decay of a proton sample. Measure the static field H_0 and calculate the gyromagnetic ratio of the proton. Estimate the rf field, H_1 , and understand the variation of the FID wave form with H_0 . What is the effect of the pulse repetition frequency on the signal amplitude?

N.B. DO NOT EXCEED 0.1% DUTY CYCLE ON THE TRANSMITTER.

2. Measure T_2^* , T_2 and T_1 for as many of the provided samples as possible. Understand the phenomenology of the physical mechanisms which underly these relaxation rates.

3. Observe and understand the origin of the two different resonances in the sample containing inequivalent fluorine nuclei.

(4) Measure the Knight shift in metallic lithium.

References:

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4. D. Shaw, *Fourier Transform NMR Spectroscopy*, Elsevier, Amsterdam (1976).
5. A. Abragam, *Principles of Nuclear Magnetism*, Clarendon, Oxford (1961).
6. J.W. Akitt, *NMR and Chemistry: An Introduction to the Fourier Transform-Multinuclear Era*, Chapman and Hall, London (1983).
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