Abstract Submitted
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Magnetic Field Dependent Lifetimes of Hyperpolarized Carboxyl ^{13}C at Cryogenic Temperatures[1] PETER NIEDBALSKI, QING WANG, CHRISTOPHER PARISH, FATEMEH KHASHAMI, ANDHIKA KISWANDHI, LLOYD LUMATA, The University of Texas at Dallas — Measurement of nuclear spin lattice relaxation times can be challenging, particularly for ^{13}C nuclei at cryogenic temperatures. At such conditions, ^{13}C has a relatively weak signal strength and very long relaxation time, making conventional methods of measuring T_1 extremely time consuming and impractical. However, using a custom-built dynamic nuclear polarization (DNP) polarizer with a sweepable superconducting magnet, the ^{13}C T_1 at many different magnetic field strengths may be measured relatively rapidly. First, the signal strength of ^{13}C NMR is highly enhanced at the polarization field. Then, the magnetic field is ramped to an alternative strength where the relaxation of the hyperpolarized signal is monitored from which T_1 may be determined. Four different molecules with carboxyl ^{13}C labeling were chosen for study using this process, namely sodium pyruvate, pyruvic acid, sodium acetate, and glycine. Samples were studied between 0.8 and 9 T and the T_1 of each of the samples was found to have power law dependence on the magnetic field between $B^{2.35}$ and $B^{3.1}$. This strong magnetic field dependence is a result of paramagnetic impurities required for polarization. These measurements are the first of their type and help to further understand dynamic nuclear polarization in the regime of high magnetic field and low temperature.

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