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Noise Studies of Polarimetry Systems for Polarized ^{3}He Targets
SUMUDU K. KATUGAMPOLA, CHRISTOPHER JANTZI, VLADIMIR NELYUBIN, GORDON D. CATES, Univ of Virginia — The NMR technique of adiabatic fast passage (AFP) often plays an important role in monitoring the polarization of ^{3}He targets polarized using spin-exchange optical pumping. The absolute calibration of such AFP-based polarimetry systems can be accomplished by comparing, either directly or indirectly, with the AFP signals of thermally polarized water. At the low magnetic fields at which spin-exchange polarized ^{3}He targets are run, however, identifying water signals amidst noise caused by external electromagnetic interferences and microphonics can be challenging. In this talk we will present results obtained from thermally polarized water samples at a field of 36 gauss with a signal-to-noise ratio greater than 10 in a single measurement. The measurements were obtained by using a specially designed NMR apparatus which includes a suspension system to suppress mechanical vibrations and shielding to reduce electromagnetic interference. Our system is part of an effort to improve polarimetry of polarized ^{3}He targets, and also provides insight into systematic effects related to the use of thermally polarized water for the calibration of low-field AFP-based NMR systems.

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