

Abstract Submitted
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”Bulk” Hyperpolarized ^{131}Xe with $P_{Xe} \sim 7\%$: a Potential Target for Neutron Optics Searches for Time-Reversal Invariance Violation¹

BOYD GOODSON, Southern Illinois University Carbondale, NOPTREX COLLABORATION — The very large parity-odd asymmetry seen in the 3.2 eV p-wave resonance in ^{131}Xe [1,2] makes it an interesting nucleus for NOPTREX. However this isotope is notoriously difficult to hyperpolarize owing to its strong nuclear quadrupole moment. We investigate the bulk preparation of hyperpolarized ^{131}Xe via spin exchange optical pumping (SEOP). Isotopic enrichment and next-generation spectrally-narrowed laser diode arrays allow for real-time observation of polarization dynamics via in situ low-field NMR, and optimization as a function of temperature, alkali metal choice (Rb and Cs), resonance offset, and other parameters. ^{131}Xe polarization values as high as $7.6\% \pm 1.5\%$ were achieved at 0.37 amagat in a 0.1 L cell (8.5×10^{20} ^{131}Xe spins), demonstrating feasibility for use in spin-polarized neutron-scattering targets. Ongoing efforts to scale up ^{131}Xe SEOP to aluminosilicate cells with larger volumes for use in measurements of pseudomagnetic precession of polarized neutrons will also be described. [1] J. J. Szymanski, W. M. Snow et al., Phys. Rev. C 53, R2576 (1996). [2] V. Skoy et al., Phys. Rev. C 53, R2573 (1996).

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