

Abstract Submitted
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Nuclear spin relaxation of ^{129}Xe due to persistent xenon dimers¹

B. SAAM, B.N. BERRY-PUSEY, B.C. ANGER, G. LAICHER, Dept. of Physics, University of Utah — An understanding of longitudinal relaxation mechanisms (characterized by the time T_1) that limit both achievable polarization and sample storage time is critically important to applications of hyperpolarized noble gases. We have measured T_1 for ^{129}Xe in Xe-N₂ mixtures at densities < 0.5 amagats in a magnetic field of 8.0 T. The intrinsic relaxation in this regime is due to fluctuations in the intramolecular spin-rotation (SR) and chemical-shift-anisotropy (CSA) interactions, mediated by the formation of ^{129}Xe -Xe persistent dimers. Our results* are consistent with previous work done in one case at much lower applied fields where the CSA interaction is negligible and in another case at much higher gas densities where transient Xe dimers mediate the interactions. The 8.0-T field suppresses the persistent-dimer mechanism: we have measured $T_1 > 25$ h at 8.0 T for ^{129}Xe at room temperature. These data also yield a maximum possible low-field T_1 for pure xenon gas at room temperature of 5.45 ± 0.2 h.

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