Abstract Submitted
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Altered States of Solid Xenon[1] MARK LIMES, ZAYD MA, BRIAN SAAM, University of Utah — Relaxation processes and structure in solid Xe were studied using hyperpolarization of ^{129}Xe via spin-exchange from optically pumped Rb. In an applied field of 2T, we studied both longitudinal and transverse ^{129}Xe relaxation; the former as a function of freezing conditions and the latter as a function of both freezing conditions and dilution of ^{129}Xe and ^{131}Xe atoms relative to spin-zero species. A flow-through polarizer [1] is used to freeze and collect solid Xe (both ^{129}Xe-enriched and naturally abundant), where we adjust the partial pressure of Xe in order to alter freezing conditions, which yield reproducible differences in spin-lattice relaxation times of greater than 10%, apparently by varying the grain size. This is surprising because the mechanism is supposed to be a bulk Raman-phonon scattering process. In a separate convection cell [2] experiment, we find that reducing the concentration of ^{129}Xe and ^{131}Xe narrows the NMR line shape, as expected. However, several anomalous features also arise, depending on the freezing rate. Dilute concentrations of spin-1/2 ^{129}Xe range from 10% to below 1%.

[1] Schrank, et al., PRA 80, 063424 (2009).
[2] Su, et al., APL 85, 2429 (2004).

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