Abstract Submitted
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Enhanced spin coherence of rubidium atoms in solid parahydrogen[1] SUNIL UPADHYAY, UGNE DARGYTE, ROBERT PRATER, VSEVOLOD DERGACHEV, SERGEY VARGANOV, TIMUR TSCHERBUL, University of Nevada, Reno, DAVID PATTERSON, University of California, Santa Barbara, JONATHAN WEINSTEIN, University of Nevada, Reno — Alkali atoms trapped in solid parahydrogen are optically addressable and have excellent spin coherence properties. They retain these properties at high spin densities, making them a promising platform for applications such as atomic magnetometry in the solid phase. We have identified the physical mechanism that limits the ensemble T_2^* as electrostatic in nature, and are able to achieve significantly longer T_2^* times by using nonclassical spin superposition states. By contrast, we find the spin-echo T_2 is limited by interactions that are magnetic in nature. Progress towards identifying the source of this magnetic decoherence will be discussed.

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