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Introducing Hyperpolarized Xenon-131 Directly Detected by NMR Spectroscopy KARL STUPIC, ZACKARY CLEVELAND, GALINA PAVLOVSKAYA, THOMAS MEERSMANN, Colorado State Univeristy — Previously, high-field NMR and MRI applications of hyperpolarized (hp) noble gasses focused on the isotopes helium-3 (spin I = 1/2), xenon-129 (spin I = 1/2) [1], and more recently krypton-83 (spin I = 9/2) [2]. In this contribution, hp xenon-131 (spin I = 3/2) was generated by spin-exchange optical pumping and separated from the rubidium vapor for high field NMR detection at 14.1 T field strength. Xenon-131 is of particular interest because of its quadrupolar nature that can be utilized for the study of surfaces [3] and for the investigation of high magnetic field effects on the electronic structure of the noble gas atom [4]. In addition, this isotope is a useful probe for quadrupolar processes during gas transfer and during NMR/MRI detection. Experiments with xenon-131, including multiple quantum filtered NMR spectroscopy [3], provides insights into similar processes present in krypton-83 and its more complicated spin system [5]. [1] D. Raftery *Ann. Rep. NMR Spec.*, **57**, 208 (2006). [2] G. Pavlovskaya, *et al.*, *Pro. Natl. Acad. Sci. U.S.A.* **102**, 18275 (2005). [3] T. Meersmann *et al.*, *Phys. Rev. Lett.* **80**, 1398 (1998). [4] T. Meersmann and M. Haake, *Phys. Rev. Lett.* **81**, 1211 (1998). [5] Z. Cleveland, *et al.*, *J. Chem. Phys.***124**, 044312 (2006).

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