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High-frequency EPR of impurities on diamond SUSUMU TAKAHASHI, MARK S. SHERWIN, Institute for Quantum and Complex Dynamics, University of California Santa Barbara, RONALD HANSON, DAVID D. AWSCHALOM, Center for Spintronics and Quantum Computation, University of California Santa Barbara — The nitrogen-vacancy (N-V) impurity center is a promising solid- state spin system for solid-state quantum information processing. Many desirable quantum properties have been found at room temperature, including long spin-coherence times, demonstration of single N-V spin quantum gate operation, discovery of rapid spin polarization and achievement of readout of single N-V spins. There have been many EPR experiments to investigate electronic structures and dynamics of impurities in diamond. Most of the studies were however performed by low- field EPR. High-frequency EPR generally has a great advantage for spectral and time resolution and absolute sensitivity due to very high spin-polarizations in high magnetic fields. High- frequency EPR for the diamond system therefore enables the investigation of ensembles of low-concentration impurities. In this presentation, we will discuss high-field properties of spin relaxations of impurities on diamond studied with 240 GHz cw and pulsed EPR.

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