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Saturation Spectroscopy in Nitrogen-Vacancy Ensembles in Diamond PAULI KEHAYIAS, University of California Berkeley, USA, MARIUSZ MRÓZEK, Jagiellonian University, Kraków, Poland, VICTOR ACOSTA, Google [x], Mountain View, CA, USA, ANDREY JARMOLA, University of California Berkeley, USA, DANIEL RUDNICKI, Jagiellonian University, Kraków, Poland, RON FOLMAN, Ben-Gurion University of the Negev, Israel, WOJCIECH GAWLIK, Jagiellonian University, Kraków, Poland, DMITRY BUDKER, University of California Berkeley, USA — The negatively-charged nitrogen-vacancy (NV^-) defect center in diamond has been used in a variety of applications, ranging from quantum information to sensing. Experiments show that the NV ground-state transitions suffer from inhomogeneous broadening, which limits the sensitivity and coherence time. To achieve narrower NV linewidths and study the sources of inhomogeneous broadening, we perform saturation spectroscopy on the NV ground-state transitions. We show that differences in magnetic field from nearby spins are the dominant source of inhomogeneous broadening in the NV ensemble, and we demonstrate that saturation spectroscopy is useful for magnetic-field-insensitive NV thermometry.

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