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A nitrogen-vacancy center magnetometer for measuring magnetization dynamics in ferromagnetic nanostructures JASON LIU, Center for Nanoscale Science and Technology, National Institute of Standards and Technology, MASAKI NAGATA, Institute for Chemical Research, Kyoto University, R.D. MCMICHAEL, Center for Nanoscale Science and Technology, National Institute of Standards and Technology — During the past decade, research into nitrogen-vacancy (NV) centers, a known defect in diamonds, has increased in popularity. This popularity is due to the ability to optically prepare and measure the magnetic state of the spin triplet associated with the NV center [1]. Optically, the ground state electrons can be excited by a 532 nm wavelength laser and the fluorescence results in the emission of red photons. Optically detected magnetic resonance (ODMR) is possible because the $m_s = \pm 1$ states create weaker fluorescence. Magnetometers with detectivity on the order of 10 nT/Hz$^{1/2}$ have been demonstrated [2]. In this talk, the design and performance of a scanning diamond NV center magnetometer for magnetization dynamics in ferromagnetic samples will be presented. In this instrument, a microwave magnetic field is used to excite precession in magnetic nanostructures and resulting shifts in the stray field are detected by changes in the ODMR of the diamond NV centers.

[1] M. W. Doherty, N. B. Manson, P. Delaney, F. Jelezko, J. Wrachtrup, L. C. L. Hollenberg, Phys. Rep., **523** (2013)
[2] L. Rondin, J.-P. Tetienne, T. Hingant, J.-F. Roch, P. Maletinsky and V. Jacques, Rep. Prog. Phys. 77 056503 (2014)

Jason Liu
Center for Nanoscale Science and Technology,
National Institute of Standards and Technology

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