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Nitrogen vacancy centers for nanoscale magnetic field mapping of micromagnets DAVID ROY-GUAY, Universite de Sherbrooke, ANDREAS RUEDIGER, JULIEN PLATHIER, INRS EMT, LILIAN CHILDRESS, McGill University, DENIS MORRIS, MICHEL PIORO-LADRIÈRE, Universite de Sherbrooke
— Nitrogen vacancy (NV) centers in diamond are nanoscale color centers with a long spin coherence time ($\sim$ 1 ms) even at room temperature (RT). Combined with the option of optical readout of a microwave-addressable state, NV centers in diamond are outstanding magneto-,electro-, or thermometers which allow for the creation of high spatial resolution nano-sensors [1]. In this work, we report on our first RT Rabi oscillations at 0.7 MHz of an ensemble of NV centers and preliminary results on an optically detected Stark shift of a single NV center. Fabrication by reactive ion etching of an array of NV nanodetectors for magnetic field mapping will also be presented. The array is mapped with a confocal photoluminescence setup to determine the NV density per pillar. Subsequent patterning of local gates will allow for high electric fields as a tuning parameter to enhance the magnetic field sensitivity of the NV array, resulting in a high precision magnetometer without the use of spin-echo sequences. Such a magnetic CCD is a promising tool to map local magnetic fields produced by micromagnets, such as those used in spin qubit architectures for fast qubit gates [2].

[1] Dolde, F. et al. Nat. Phys. 7, 459-463 (2011)
[2] Pioro-Ladrière, M. et al. Nat. Phys. 4, 776-779 (2008)

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