Abstract Submitted
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Towards coupling nitrogen vacancy spins to spin-transfer-driven nanoscale magnetic circuits[1] ADRIAN SOLYOM, ZACKARY FLANSBERRY, Department of Physics, McGill University, Montreal, Québec, Canada, ALEXANDRE BOURASSA, The Institute for Molecular Engineering, The University of Chicago, Chicago, Illinois, USA, JACK SANKEY, LILIAN CHILDRESS, Department of Physics, McGill University, Montreal, Québec, Canada — The nitrogen vacancy (NV) center in diamond is a solid state spin system with long coherence times, with promising applications in quantum information and precision sensing. Optical readout of the spin state allows for the detection of magnetic fields, in principle localized at the nano-scale. Our first goal is to use NV sensors to measure the stray field from magnetic nanocircuits, fabricated on the diamond surface and controlled by spin-polarized currents. Thus far we have fabricated Py/Pt nanowires on single-crystal diamond having a layer of NV centers implanted ∼100 nm below the surface. Using the Spin Hall torque from the platinum layer, we can efficiently drive ferromagnetic resonance in the wires, and detect the response via its anisotropic magnetoresistance. We discuss preliminary efforts toward observing spatially- and spectrally-resolved stray fields using nearby NVs, as well as long term considerations for controlling NV centers via related magnetic nanocircuits.

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