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Techniques for studying magnetic materials with NV-diamond HUILIANG ZHANG, FRANCESCO CASOLA, TOENO VAN DER SAR, Harvard University, MEHMET ONBASLI, CAROLINE ROSS, Massachusetts Institute of Technology, AMIR YACOBY, RONALD WALSWORTH, Harvard University — The study of real space condensed matter magnetism with high spatial resolution is an active research field of central importance in fundamental experimental solid state physics, spintronics and with potential applications in information processing. We present a set of novel experimental methods, based on nitrogen-vacancy (NV) centers in diamonds, recently proposed by theory [1] and whose feasibility is currently being investigated in our lab. We discuss how these ideas are tightly linked with the remarkable possibility of creating a magnetic coherent coupling between distant NVs. We will also report our current efforts to integrate NV-diamond fabrication with Yttrium Iron Garnet (YIG), which will serve as a test bed for these measurements.

[1] P. Stano et al., PRB 88, 045441 (2013); L. Trifunovic et al., arXiv:1409.1497 (2014); L. Trifunovic et al., PRX 3, 041023 (2013).

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