

Abstract Submitted
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Detecting Magnetic Monopoles
in Spin Ice with NV-magnetometry FELIX FLICKER, University of California, Berkeley, FRANZISKA KIRSCHNER, Oxford University, NORMAN YAO, University of California, Berkeley, STEPHEN BLUNDELL, Oxford University —
Magnetic monopoles, isolated north and south poles, appear not to exist as fundamental particles in our universe. Nevertheless, it has been proposed that they may emerge as quasiparticles in certain materials: the geometrically-frustrated ‘spin ice’ pyrochlores dysprosium and holmium titanate. Despite a great deal of experimental and theoretical work, the smoking gun signature of magnetic monopoles in spin ice remains to be discovered. A promising candidate for the detection of individual magnetic monopoles comes in the form of Nitrogen-Vacancy (NV) defects in diamond, which act as very sensitive probes of vector magnetic fields on the nanometre scale. We present the result of Monte Carlo modeling for the precise signals one would expect to see with nanometre-scale probes such as NV-magnetometers or muon spin rotation.

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