

Abstract Submitted
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Challenges in the collective behaviour of spin ice materials CLAUDIO CASTELNOVO, TCM group, Cavendish Laboratory, University of Cambridge, RODERICH MOESSNER, Max Planck Institute for the Physics of Complex Systems, GABRIELE SALA, Department of Physics, Royal Holloway University of London, SHIVAJI SONDHI, Department of Physics, Princeton University — The opportunity to observe magnetic monopoles in spin ice materials has driven a significant theoretical and experimental research effort over the past few years. While a broad class of experimental results have confirmed the monopole picture, some experiments continue to present tantalising puzzles which have not yet been possible to resolve via straightforward application of Coulomb liquid theories a la Debye-Hückel. This is illustrated perhaps most strikingly by the departure from the expected asymptotic Arrhenius behaviour of the characteristic relaxation time scales observed at very low temperatures in magnetisation and magnetic susceptibility measurements. Here we investigate some of these phenomena and attempt to identify the necessary extensions of existing theories.

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