

Abstract Submitted
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Impurity and boundary effects on magnetic monopole dynamics in spin ice J.B. KYCIA, H.M. REVELL, L.R. YARASKAVITCH, J.D. MASON, Department of Physics and Astronomy, University of Waterloo, Waterloo, Ontario, N2L 3G1, Canada, K.A. ROSS, H.M.L. NOAD, H.A. DABKOWSKA, B.D. GAULIN, Department of Physics and Astronomy, McMaster University, Hamilton, ON, L8S 4M1, Canada, P. HENELIUS, Dept. of Theoretical Physics, Royal Institute of Technology, SE-106 91 Stockholm, Sweden — Using a SQUID magnetometer, we measure the time-dependent magnetic relaxation in $\text{Dy}_2\text{Ti}_2\text{O}_7$ and find that it decays with a stretched exponential followed by a very slow long-time tail. In a Monte Carlo simulation governed by Metropolis dynamics we find that surface effects and a very low level of stuffed spins (0.30%) - magnetic Dy ions substituted for non-magnetic Ti ions - can explain these signatures in the relaxation. We find that the additional spins trap the magnetic monopole excitations and provide the first example of how defects in a spin-ice material can obstruct the flow of monopoles.

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