

Abstract Submitted
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Creation and Measurement of Magnetic Charge Currents in Spin Ice SEAN GIBLIN, Rutherford Appleton Lab, UK, STEVEN BRAMWELL, University College London, UK, PETER HOLDSWORTH, University of Lyon, France, PRABHAKARAN DHARMALINGAM, University of Oxford, UK, IAN TERRY, University of Durham, UK — The recent discovery of magnetic charge in spin ice raises the question of whether long-lived currents of magnetic “monopoles” can be created and manipulated by applying magnetic fields. Here we show that they can; by applying a magnetic field pulse to a $\text{Dy}_2\text{Ti}_2\text{O}_7$ spin ice crystal at 0.36 Kelvin, we create a relaxing magnetic current that lasts for several minutes. We measure the current by means of the electromotive force it induces in a solenoid coupled to a susceptometer and quantitatively describe it using a chemical kinetic model of point-like charges obeying the Onsager-Wien mechanism of carrier dissociation and recombination.

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