Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Quantum Ice : Experimental Signatures NIC SHANNON, Clarendon Laboratory, University of Oxford, Oxford OX1 3PU, UK; Okinawa Institute of Science and Technology, Okinawa, Japan 904-0495, OWEN BENTON, H H Wills Physics, University of Bristol, Bristol BS8 1TL, UK, OLGA SIKORA, H H Wills Physics, University of Bristol, Bristol BS8 1TL, UK; Okinawa Institute of Science and Technology, Okinawa, Japan 904-0495, KARLO PENC, Research Institute for Solid State Physics and Optics, H-1525, Budapest, Hungary, PAUL MCCLARTY, FRANK POLLMANN, RODERICH MOESSNER, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, PETER FULDE, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany; Asia Pacific Center for Theoretical Physics, Pohang, Korea — "Quantum Spin Ice" materials have attracted considerable attention as three-dimensional examples of quantum spin liquids. Recently, we have used zero-temperature Quantum Monte Carlo simulation to explore one possible scenario for these materials, confirming the possibility of a "quantum ice" state driven by quantum tunnelling between an extensive number of different spin-ice configurations [1]. Here we address the simple question : what would such a quantum ice look like in experiment ? We focus in particular on the fate of "pinch point" singularities seen in neutron scattering experiments on spin ice materials, showing how these are suppressed and ultimately eliminated as the system is cooled to its ground state [1,2].

[1] N. Shannon et al., arXiv:1105.4196
[2] O. Benton et al., in preparation.

Nic Shannon
Okinawa Institute of Science and Technology, Okinawa, Japan 904-0495

Date submitted: 12 Dec 2011 Electronic form version 1.4