

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Low-temperature Spin-Ice State of Quantum Heisenberg Magnets on Pyrochlore Lattice** YUAN HUANG, KUN CHEN, University of Massachusetts, Amherst; University of Science and Technology of China, YOUJIN DENG, University of Science and Technology of China; University of Massachusetts, Amherst, NIKOLAY PROKOF'EV, BORIS SVISTUNOV, University of Massachusetts, Amherst; Russian Research Center “Kurchatov Institute” — We establish that the isotropic spin-1/2 Heisenberg antiferromagnet on pyrochlore lattice enters a spin-ice state at low, but finite, temperature. Our conclusions are based on results of the bold diagrammatic Monte Carlo simulations that demonstrate good convergence of the skeleton series down to temperature  $T = J/6$ . The “smoking gun” identification of the spin-ice state is done through a remarkably accurate microscopic correspondence for static spin-spin correlation function between the quantum Heisenberg and classical Heisenberg/Ising models at all accessible temperatures. In particular, at  $T/J = 1/6$ , the momentum dependence shows a characteristic bow-tie pattern with pinch points. By numerical analytical continuation method, we also obtain the dynamic structure factor at real frequencies, showing a diffusive spinon dynamics at pinch points and spin wave continuum along the nodal lines.?

Yuan Huang  
University of Massachusetts, Amherst, Massachusetts; University of Science and Technology of China

Date submitted: 04 Nov 2015

Electronic form version 1.4