

MAR13-2012-020382

Abstract for an Invited Paper  
for the MAR13 Meeting of  
the American Physical Society

**Spin Dynamics in Na<sub>2</sub>IrO<sub>3</sub> Probed by Inelastic Neutron Scattering: Implications for Kitaev Physics<sup>1</sup>**

RADU COLDEA, University of Oxford

We explore the spin dynamics in the layered antiferromagnet Na<sub>2</sub>IrO<sub>3</sub>, a candidate for the Kitaev spin model on the honeycomb lattice [1]. Using powder inelastic neutron scattering with an optimised setup to minimise neutron absorption by Ir we observed evidence for dispersive spin wave excitations of the Ir moments below a zone-boundary energy of 5 meV [2]. Results are compared quantitatively with predictions of a Kitaev-Heisenberg model, as well as a Heisenberg model with further neighbour couplings, both with a magnetic ground state of zig-zag ferromagnetic chains ordered antiferromagnetically. By combining single-crystal xray diffraction and ab initio calculations we propose a revised crystal structure model with significant departures from the ideal case of regular IrO<sub>6</sub> octahedra and 90° Ir-O-Ir bonds required for large Kitaev exchanges.

[1] J. Chaloupka, G. Jackeli, and G. Khaliullin, Phys. Rev. Lett. 105, 027204 (2010); arXiv:1209.5100 (2012).

[2] S.K. Choi, R. Coldea, A.N. Kolmogorov, T. Lancaster, I.I. Mazin, S.J. Blundell, P.G. Radaelli, Yogesh Singh, P. Gegenwart, K.R. Choi, S.-W. Cheong, P.J. Baker, C. Stock and J. Taylor, Phys. Rev. Lett. 108, 127204 (2012).

<sup>1</sup>This research was partly supported by EPSRC (UK).