Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Weak magnetic transitions in pyrochlore $Bi_2Ir_2O_7$ PETER BAKER, FRANCIS PRATT, ISIS Facility, STFC Rutherford Appleton Laboratory, Didcot, OX11 0QX, UK, JOHANNES MOELLER, BIL HAYES, STEPHEN BLUNDELL, Oxford University Department of Physics, Oxford, OX1 3PU, UK, TOM LANCASTER, University of Durham, Centre for Materials Physics, Durham, DH1 3LE, UK, TONGFEI QI, GANG CAO, Department of Physics and Center for Advanced Materials, University of Kentucky, Lexington, KY40506 — The pyrochlore iridate $Bi_2Ir_2O_7$ is analogous to the rare earth pyrochlores RIr_2O_7 (R = Y and Pr-Lu) but has no rare earth moments or f electrons to interact with the Ir subsystem. This makes it an ideal system in which to study the Ir magnetism in isolation. Bulk measurements showed that it is metallic down to 2K and no indication of magnetic ordering was found down to 50mK. The magnetic field dependence of the low-temperature specific heat shows large changes in both the linear and cubic contributions and the large Wilson ratio of 53.5 suggests proximity to a quantum critical point [1]. Our muon spin relaxation measurements find a bulk magnetic transition at 1.84(3)K and the form of the data suggests that the low-temperature state represents ordering of exceptionally small magnetic moments with persistent weak dynamics. The relaxation rate increases further below 0.23(4)K, coincident with a growth in the specific heat, suggesting another magnetic transition. The magnetic field experienced by muons is ~ 0.7T at low-temperature, around two orders of magnitude smaller than that in other pyrochlore iridates, corresponding to moments ~ 0.01 μ_B/Ir.

[1] T. F. Qi et al., J. Phys.: Condens. Matter 24, 345601 (2012).

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Date submitted: 26 Nov 2012 Electronic form version 1.4