

Abstract Submitted
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Magneto-elasticity of a spin liquid: X-ray studies of Tb₂Ti₂O₇ in pulsed magnetic fields J.P.C. RUFF, McMaster University, Z. ISLAM, Argonne National Lab, B.D. GAULIN, McMaster University, H. NOJIRI, IMR, Tohoku University, Y. MATSUDA, ISSP, U of Tokyo., J.P. CLANCY, K.A. ROSS, McMaster University, J.C. LANG, Argonne National Lab, A. DABKOWSKI, H.A. DABKOWSKA, McMaster University — At low temperatures, the pyrochlore anti-ferromagnet Tb₂Ti₂O₇ exhibits a dynamically short-range ordered magnetic state. No credible evidence for long range order has been reported in the literature down to temperatures as low as 20 mK, despite the fact that the material displays a Curie-Weiss temperature roughly a thousand times larger than this. Intriguingly, under application of magnetic field at these low temperatures the system displays giant magnetostriction (as large as that of the best commercial materials), and a non-trivial long-range ordered magnetic state. Both effects appear to be strongly sensitive to the direction of the applied magnetic field. We have performed high-resolution pulsed-field x-ray scattering measurements, which constitute the first successful experiment commissioning the mini-coil magnet at Argonne National Lab. This new instrument facilitates single crystal x-ray scattering experiments at temperatures as low as 4.5 K, and in applied magnetic fields as large as 30 Tesla. Our measurements reveal rich magnetoelastic effects in the spin liquid pyrochlore terbium titanate.

Jacob Ruff
McMaster University

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