Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Magnetoelastic excitations in Tb2Ti2O7 in applied magnetic field

MARTIN RUMINY, MICHEL KENZELMANN, TOM FENNELL, Paul Scherrer Institut — The key puzzle in $Tb_2Ti_2O_7$ is how the expected long-range magnetic order and/or structural phase transition are suppressed, resulting in the stabilization of the spin liquid phase [1]. This spin liquid phase supports spin ice-like powerlaw correlations [2,3,4], and an array of anomalous magnetoelastic properties (see e.g. [5]). Recently we have discovered a microscopic coupling between the magnetic and lattice fluctuations, which form a hybrid propagating excitation with both spin and phonon components [6,7]. Using inelastic neutron scattering, we have now explored the effect of an applied magnetic field on the magnetoelastic coupling. I will show how these experiments cast light not only on the coupling between spins and phonons in $Tb_2Ti_2O_7$, but also on other unexplained phenomena in $Tb_2Ti_2O_7$, such as the field induced long-range antiferromagnetic order [8]. [1] Gardner et al., Rev. Mod. Phys. 82, 53 (2010); [2] Fennell et al., PRL 109, 017201 (2012); [3] Petit et al., PRB 86, 174403 (2012); [4] Fritsch et al., PRB 87, 094410 (2013); [5] Ruff et al., PRL 99, 237202 (2007); [6] Fennell et al., PRL 112, 017203 (2014); [7] Guitteny et al., PRL 111, 087201 (2013); [8] Rule et al., PRL 96, 177201 (2006);

Martin Ruminy
Paul Scherrer Institut

Date submitted: 14 Nov 2014 Electronic form version 1.4