Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Altering TCNQ-TCNQ interactions and a study of the spin-Peierls state including muon-fluorine entanglement ADAM BERLIE[1], Australian National University, IAN TERRY, Durham University, SEAN GIBLIN, Cardiff University, MAREK SZABLEWSKI, Durham University — Potassium TCNQ is a well known spin-Peierls system where a spin gap opens at 390 K due to the strong electron-phonon coupling within the material, essentially forming 1D stack of antiferromagnetially coupled anion TCNQ dimers. We show that on substitution of $TCNQF_4$ for the TCNQ this changes the interaction of the anions and shifts T_{sp} to 150 K. Additionally, substitution of TCNQ by $TCNQBr_2$ produces a sample with an even lower interaction strength. These observations demonstrate the ability to tune this system from a chemical point of view. Muon spin relaxation measurements show that in the vicinity of T_{sp} the system is dominated by magnetic fluctuations and these persist to lower temperatures until the moments exhibit a quasi-static state on the time scale of the μSR experiment (MHz range). Within the KTCNQF4 sample we also observe the emergence of a small contribution from an entangled F-μ^+-F where the data could be modeled using two environments that can help suggest possible muon stopping sites.

[1]Also affiliated to The Bragg Institute, ANSTO, Australia.

Adam Berlie
Australian National University

Date submitted: 12 Nov 2014 Electronic form version 1.4