Abstract Submitted
for the DNP16 Meeting of
The American Physical Society

Distinguishing magnetic vs. quadrupolar relaxation in b-NMR using 8Li and 9Li[1] A. CHATZICHRISTOS, R.M.L. MCFADDEN, V.L. KARNER, D.L. CORTIE, A. FANG, UBC, C.D.P. LEVY, TRIUMF, W.A. MACFARLANE, UBC, G.D. MORRIS, M.R. PEARSON, TRIUMF, Z. SALMAN, Lab.for Muon Spin Spectroscopy,Paul Scherrer Institute, R.F. KIEFL, UBC,TRIUMF — Beta-detected NMR is a powerful technique in condensed matter physics.It uses the parity violation of beta decay to detect the NMR signal from a beam of highly polarized radionuclides implanted in a sample material.Spin-lattice relaxation (SLR) is studied by monitoring the rate with which the asymmetry between the beta counts in two opposing detectors is lost.Unlike classical NMR,b-NMR can study thin films and near-surface effects.The most common b-NMR isotope at TRIUMF is 8Li,which has a quadrupole moment,thus it is sensitive to both magnetic fields and electric field gradients.A challenge with 8Li b-NMR is identifying the predominant mechanism of SLR in a given sample.It is possible to distinguish between SLR mechanisms by varying the probe isotope.For two isotopes with different nuclear moments,the ratio of SLR rates should be different in the limits of either pure magnetic or quadrupolar relaxation.This method has been used in classical NMR and we report its first application to b-NMR.We measured the SLR rates for 8Li and 9Li in Pt foil and SrTiO3.Pt is a test case for pure magnetic relaxation.SrTiO3 is a non-magnetic insulator,but the source of its relaxation is not well understood.Here we show that its relaxation is mainly quadrupolar.

[1]We thank TRIUMFs CMMS for their technical support. This work was supported by: NSERC Discovery Grants to R.F.K. and W.A.M.; and IsoSiM fellowships to A.C. and R.M.L.M.

Aris Chatzichristos
Univ of British Columbia

Date submitted: 29 Jun 2016 Electronic form version 1.4