Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

On Polarized Neutron Scattering from a Prototypical NMR Spin-Modulated System MICHAEL KOTLARCHYK, GEORGE THURSTON, Rochester Institute of Technology — The potential for utilizing the scattering of polarized neutrons from nuclei whose spin has been modulated using nuclear magnetic resonance (NMR) has previously been considered by Buckingham (1). That work broadly considered the overall feasibility and utility of such experiments with a potential aim, for example, of studying slow structural changes such as those that occur in biological macromolecules. Here, from first principles, we present a more in-depth development of the differential scattering cross-sections that would arise in such measurements from a prototypical and simplified model target system containing non-interacting nuclei with non-zero spins. In particular, we investigate the modulation of the polarized scattering cross-sections following the application of RF pulses that impart initial transverse rotations to selected sets of spin-1/2 nuclei. The aim is to lay the foundation for enhancing scattering signals from chosen nuclei, so as to advance knowledge of macromolecular or liquid structure. (1) A.D. Buckingham, Chem. Phys. Letts. 2003(371):517-521

George Thurston
Rochester Institute of Technology

Date submitted: 06 Nov 2015 Electronic form version 1.4