Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Magnetic excitations in Fe1.01Te0.7Se0.3 JOOSEOP LEE, University of Virginia, IGOR ZALIZNYAK, Brookhaven National Laboratory, NAOYUKI KATAYAMA, Nagoya University, RYOICHI KAJIMOTO, Japan Proton Accelerator Research Complex, SEUNGHUN LEE, University of Virginia — Recently, there have been intense studies on the magnetism in FeTe1-xSex, which resulted in contradicting observations making the nature of its magnetism controversial. While the Fermi surface nesting picture can well predict the position of magnetic resonance in superconducting region, it clearly fails to predict the magnetic ordering wave vector in the parent compound. To investigate the magnetism in this iron chalcogenide series, we synthesized Fe1.01Te0.7Se0.3. At this doping, it resides very close to the superconducting doping region, but is in spin glass phase. By using the Time-of-Flight neutron scattering, we obtained magnetic dispersions in this material at energies up to 257meV. We find characteristic lines of diffuse scattering in Q-space, which provide the evidence for highly frustrated interactions. These lines of degeneracy persist up to about 10meV, and start to disperse above it. Based on the shape of this quasi-degenerate manifold in Q-space, we propose a description of spin excitations using the J1-J2-J3 Heisenberg model on square lattice model near the limit of maximum frustration with weak extrinsic perturbation.

Jooseop Lee
University of Virginia

Date submitted: 11 Nov 2011 Electronic form version 1.4