Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Effect of nematic order on the spin fluctuation spectrum of LaFeAsO[1] QIANG ZHANG, Ames Laboratory, U.S. DOE; Department of Physics and Astronomy, Iowa State University, RAFAEL M. FERNANDES, School of Physics and Astronomy, University of Minnesota, JIAQIANG YAN, Ames Laboratory, U.S. DOE; Oak Ridge National Laboratory, R.W. MCCALLUM, THOMAS A. LOGRASSO, Ames Laboratory, U.S. DOE; Division of Materials Sciences and Engineering, Iowa State University, SONGXUE CHI, Oak Ridge National Laboratory, DAVID VAKNIN, ROBERT J. MCQUEENEY, Ames Laboratory, U.S. DOE; Department of Physics and Astronomy, Iowa State University — Inelastic neutron scattering measurements on the LaFeAsO antiferromagnetic (AFM) system reveal distinct temperature-dependent behavior in the low-energy spin dynamics. As expected, the dynamic susceptibility at the AFM wavevector peaks at the AFM transition temperature T_{N}, but also displays an anomaly at the orthorhombic-to-tetragonal transition temperature T_{S}. The spin-spin correlation length increases rapidly below T_{S} once long-range nematic order sets in. The sharp changes in both the dynamic susceptibility and the spin-spin correlation length at T_{S} evidence a strong effect of nematic order on the magnetic spectrum, in agreement with models that attribute the structural transition to an electronic nematic phase driven by spin fluctuations.

[1]This work is supported by the US Department of Energy, Office of Basic Energy Sciences, under Contract No. DE-AC02-07CH11358 and No. DE-AC02-06CH11357.

Qiang Zhang
Ames Laboratory, U.AS. DOE

Date submitted: 15 Nov 2013 Electronic form version 1.4