Abstract Submitted
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Sharp enhancement of spin fluctuations by nematic order in iron pnictides[1] QIANG ZHANG, Ames Laboratory and Iowa state university, RAFAEL. M. FERNANDES, School of Physics and Astronomy, University of Minnesota,, JAGAT LAMSAL, Ames Laboratory and Iowa state university, JIAQIANG YAN, SONGXUE CHI, Oak Ridge National Laboratory, GREGORY. S. TUCKER, Ames Laboratory and Iowa state university, DANIEL. K. PRATT, JEFFREY. W. LYNN, NIST Center for Neutron Research, National Institute of Standards and Technology, R. W. MCCALLUM, PAUL. C. CANFIELD, THOMAS A. LOGRASSO, ALAN I. GOLDMAN, DAVID VAKNIN, ROBERT J. MCQUEENEY, Ames Laboratory and Iowa state university — Inelastic neutron scattering was employed to investigate the impact of electronic nematic order on the magnetic spectra of LaFeAsO and $Ba(Fe_{0.953}Co_{0.047})_2As_2$. These materials are ideal to study the paramagnetic-nematic state, since the nematic order, signaled by the tetragonal-to-orthorhombic transition at T_S, sets in well above the stripe antiferromagnetic ordering at T_N. We find that the temperature-dependent dynamic susceptibility displays an anomaly at T_S followed by a sharp enhancement in the spin-spin correlation length, revealing a strong feedback effect of nematic order on the low-energy magnetic spectrum. Our findings can be consistently described by a model that attributes the structural/nematic transition to magnetic fluctuations, and unveils the key role played by nematic order in promoting the long-range stripe antiferromagnetic order in iron pnictides.

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