Abstract Submitted
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Anisotropic 2D Spin Fluctuations in Superconducting $Ba(Fe_{0.926}Co_{0.074})_2As_2$[1] HAIFENG LI, Ames Laboratory and Department of Physics and Astronomy, Iowa State University, COLLIN BROHOLM, Institute for Quantum Matter and Department of Physics and Astronomy, The Johns Hopkins University, DAVID VAKNIN, DANIEL PRATT, WEI TIAN, Ames Laboratory and Department of Physics and Astronomy, Iowa State University, NI NI, D. ABERNATHY, M. STONE, Oak Ridge National Laboratory, SOULEYMANE DIALLO, JEREL ZARESTKY, SERGEY BUD'KO, RAFAEL FERNANDES, PAUL CANFIELD, ROBERT MCQUEENEY, Ames Laboratory and Department of Physics and Astronomy, Iowa State University — We report inelastic neutron scattering from superconducting $Ba(Fe_{0.926}Co_{0.074})_2As_2$. For energies up to 150 meV, magnetic excitations are found close to the 2D antiferromagnetic (AFM) wavevector $\mathbf{Q_{AFM}}$ = (0.5 0.5) in the tetragonal symmetry of the parent compound $BaFe_2As_2$. We observe an anisotropy of the in-plane spin fluctuations, allowing an estimate of the effective AFM spin exchange interactions: $J_2/J_1 = 1.0(3)$ (J_1: NN; J_2: NNN). The 8 meV spin resonance displays a similar in-plane anisotropy. Above 100 meV, the anisotropy evolves into two separated maxima displaced transverse to $\mathbf{Q_{AFM}}$. While the low energy results can be interpreted in terms of competing exchange interactions, the more complex high energy/wavevector dependence requires an itinerant model.

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