

Abstract Submitted
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Compositional dependence of low energy spin fluctuations in $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ ¹ GREGORY TUCKER, D.K. PRATT, A. THALER, N. NI, Ames Laboratory and Department of Physics & Astronomy, Iowa State University, Ames, IA 50011, K. MARTY, A.D. CHRISTIANSON, M.D. LUMSDEN, Quantum Condensed Matter Division, Neutron Science Directorate, Oak Ridge National Laboratory, Oak Ridge, TN 37831, S.L. BUD'KO, P.C. CANFIELD, A. KREYSSIG, A.I. GOLDMAN, R.J. MCQUEENEY, Ames Laboratory and Department of Physics & Astronomy, Iowa State University, Ames, IA 50011 — The low energy magnetic fluctuation spectrum of $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ samples in the range $x = (0.014, 0.055)$ were studied in their antiferromagnetic ordered states using inelastic neutron scattering. The parent compound BaFe_2As_2 exhibits gapped spin-wave excitations at $\mathbf{Q}_{\text{AFM}} = (\mathbf{1}, \mathbf{0}, \mathbf{1})$ with two gap energies [corresponding to in-Fe-plane and out-of-Fe-plane transverse excitations of the ordered moment]. Substitution of Co for Fe via doping acts to increase Landau damping without significantly modifying the parent compound spin-gap structure. For small amounts of Co the two-gap structure is resolvable in our measurements. For larger Co-doping the damping increases sufficiently to obscure the parent compound gap structure and the measured \mathbf{Q}_{AFM} excitation spectra is best described by a diffusive model. Interestingly, the change in excitation character corresponds in composition with the appearance of superconductivity in $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}$; these two effects may very well be related.

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