

Abstract Submitted
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Neutron scattering studies of competing magnetic and superconducting order parameters in $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ DANIEL PRATT, RAFAEL FERNANDEZ, WEI TIAN, JEREL ZARETSKY, ANDREAS KREYSSIG, SHIBABRATA NANDI, MIN GYU KIM, ALEX THALER, NI NI, SERGEY BUD'KO, PAUL CANFIELD, ROBERT MCQUEENEY, JORG SCHMALIAN, ALAN GOLDMAN, Ames Laboratory / Iowa State University — Neutron and x-ray diffraction studies show that the simultaneous first-order transition to an orthorhombic and antiferromagnetic (AFM) ordered state in BaFe_2As_2 splits into two transitions, and T_N as well as the ordered moment decrease as x (%Co) increases. Recent experiments have demonstrated that for a range of doping, superconductivity and magnetism co-exist homogeneously and compete for electrons. The magnetic order parameters have been measured for a series of Co doping from $x = 0$ to 6.3% and a clear drop in sublattice magnetization is observed at T_C for each compound. Comparison of these measurements to mean field calculations has provided insight into these competing order parameters. The good agreement between the measurement and calculations show that neutron scattering is a useful probe for understanding the symmetry of the superconducting gap in the iron-arsenide superconductors. The work at the Ames Laboratory was supported by the US DOE, office of science, under contract No. DE-AC02-07CH11358.

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