Abstract Submitted
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Anomalous suppression of the orthorhombic distortion in superconducting $\mathbf{Ba(Fe_{1-x}Co_x)_2As_2}$ S. NANDI, M.G. KIM, A. KREYSSIG, R.M. FERNANDES, D.K. PRATT, A. THALER, N. NI, S.L. BUD'KO, P.C. CANFIELD, J. SCHMALIAN, R.J. MCQUEENEY, A.I. GOLDMAN, Ames Laboratory; Dep. of Physics and Astronomy, Iowa State University, Ames — The interplay between superconductivity, magnetism and structure has become a major theme of research in the iron arsenide families of superconductors. Here we report high-resolution x-ray diffraction measurements that reveal an unusually strong response of the lattice to superconductivity in $Ba(Fe_{1-x}Co_x)_2As_2$ single crystals. Below T_C the orthorhombic distortion of the lattice is suppressed and, for Co-doping near x $\sim$ 0.063, the orthorhombic structure evolves smoothly to a reentrant tetragonal structure. We propose that the coupling between orthorhombicity and superconductivity is indirect and arises due to the magneto-elastic coupling, in the form of emergent nematic order, and the strong competition between magnetism and superconductivity. – 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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