Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Nature of phase transitions in the parent and lightly electron doped $BaFe_2As_2$ compounds[1] MIN GYU KIM, R.M. FERNANDES, A. KREYSSIG, Ames Laboratory, Dept. of Physics and Astronomy, Iowa State University, Ames, IA, J.W. KIM, Advanced Photon Source, ANL, Argonne, IL, A. THALER, S.L. BUD'KO, P.C. CANFIELD, R.J. MCQUEENEY, J. SCHMALIAN, A.I. GOLDMAN, Ames Laboratory, Dept. of Physics and Astronomy, Iowa State University, Ames, IA — We present a combined high-resolution x-ray diffraction and x-ray resonant magnetic scattering study of as-grown $BaFe_2As_2$. The structural and magnetic transitions must be described as a two-step process. The undoped $BaFe_2As_2$ parent compound manifests a second-order structural transition from the high-temperature paramagnetic tetragonal structure to a paramagnetic orthorhombic phase and a first-order antiferromagnetic transition from the paramagnetic orthorhombic phase to an antiferromagnetic orthorhombic phase at slightly lower temperature. As electrons are introduced by Co or Rh, the phase transitions evolve toward second-order transitions. Using these results, we provide an estimate of the position of a tricritical point in the phase diagram of $Ba(Fe_{1-x}Co_x)_2As_2$.

[1]The work at the Ames Laboratory was supported by US DOE, Office of Basic Energy Sciences, DMSE, contract DE-AC02-07CH11358.

Min Gyu Kim
Ames Laboratory, Dept. of Physics and Astronomy,
Iowa State University, Ames, IA

Date submitted: 17 Nov 2011 Electronic form version 1.4