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Local structure of cobalt-doped iron pnictide superconductors J. NIEDZIELA, ORNL, Oak Ridge, TN 37830; Dept of Phys & Astr. U. of Tenn., Knoxville, TN 37996, D. PARSHALL, Dept of Phys. & Astr. U. of Tenn., Knoxville, TN 37996, W. DMOWSKI, Dept of Mat. Sci. & Engr., U. of Tenn., Knoxville, TN 37996, D. MANDRUS, B.C. SALES, A.S. SEFAT, M.A. MCGUIRE, ORNL, Oak Ridge, TN 37831, TH. PROFFEN, A. LLOBET, Lujan Center, LANL, Los Alamos, NM 87545, T. EGAMI, ORNL, Oak Ridge, TN 37831; Depts. of Physics & Astr. and Mat. Sci. & Engr., U. of Tenn., Knoxville, TN 37996 — Most superconducting iron-pnictides show no long-range AFM order, but strong spin excitations and core electron spectroscopy suggest that Fe ions may be locally spin polarized, with dynamic spin fluctuations. Further, measured magnetic moments are smaller than predicted. We report local structure studies of superconducting $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ ($x=0.08,0.1$). Negative thermal expansion was observed from Rietveld refinements with an inflection point at $T\sim 50\text{K}$ at $x=0.08$ ($T_c = 22\text{K}$). Pair density function analysis shows two distinct As-As bond lengths, indicating either distortion in the FeAs_4 tetrahedra, or two distinct environments for Fe. The presence of both the FeAs_4 tetrahedral distortion and the negative thermal expansion could indicate the increase in the local Fe magnetic moment below 50K. Further, this hypothesis would suggest that the maximum T_c of 55K may be bound by the change in the local magnetic state around 50K.

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