Abstract Submitted
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Effect of directional strain on the phase diagram of $\mathbf{Ca(Fe_{1-x}Co_x)_2As_2}$ A. E. BÖHMER, G. DRACHUK, M. A. TANATAR, S. L. BUD'KO, R. PROZOROV, P. C. CANFIELD, Ames Laboratory and Iowa State University — The iron-based superconductor $Ca(Fe_{1-x}Co_x)_2As_2$ is exceptionally sensitive to directional stress with *ab*-plane compression stabilizing and *c*-axis compression de-stabilizing the orthorhombic antiferromagnetic phase [1]. Due to differential thermal expansion between a sample and a substrate, an effective in-plane compressive strain can be exerted on it upon cooling. We found that this strain induces a phase transition even in overdoped compositions where the usual magneto-structural transition, observed in underdoped compounds, does not occur in the unstrained state. The induced transition has been characterized by 4-probe resistivity, elastoresistivity (the derivative of resistivity with respect to deformations), polarized light microscopy and Mössbauer spectroscopy. We found a pronounced increase of the resistivity and a divergence of the elastoresistivity coefficients, which is a signature of the tetragonal-to-orthorhombic transition in other iron-based superconductors. The polarized light images directly show the formation of a particularly rich domain pattern below the transition in these samples. This work was supported by the Ames Laboratory, US DOE, under Contract No. DE-AC02-07CH11358. [1] Bud'ko et al., PRB 88,064513 (2013).

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