Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Magneto-elastic coupling in detwinned $Sr(Fe_{1-x}Co_x)_2As_2$ by inelastic x-ray scattering[1] NAOKI MURAI, RIKEN SPring-8 Center and Osaka University, TATSUO FUKUDA, RIKEN SPring-8 Center and JAEA, MASAMICHI NAKAJIMA, TATSUYA KOBAYASHI, Osaka University, HIROSHI UCHIYAMA, RIKEN SPring-8 Center and JASRI, SATOSHI TSUTSUI, JASRI, DAISUKE ISHIKAWA, RIKEN SPring-8 Center and JASRI, HIROKI NAKAMURA, MASAHIKO MACHIDA, JAEA, SHIGEKI MIYASAKA, SETSUKO TAJIMA, Osaka University, ALFRED BARON, RIKEN SPring-8 Center and JASRI
— We present phonon dispersion measurements from detwinned single crystals of $Sr(Fe_{1-x}Co_x)_2As_2$ with different doping levels(x=0 and 0.08) using inelastic x-ray scattering with 1.5 meV resolution at SPring-8. The crystals were detwinned by application of in-plane uniaxial stress. This allowed us to measure single domain phonon structure in the magnetically ordered state. We clearly identified the change in the phonon dispersion induced by the onset of magnetic order, with phonon energies depending on orientation of the phonon wave vector relative to the Fe moment. We compare our results to *ab-initio* pseudo potential calculations: Magnetic calculations give better agreement than non-magnetic calculations, but in most parts of the Brillouin zone investigated, they overestimate the magnitude of the mode splitting and in fact often fail to predict even the correct sign of the splitting.

[1]This work was partly supported JST, EU-Japan program "IRON-SEA".

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Date submitted: 13 Nov 2014 Electronic form version 1.4