Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Evolution of Crystal Structure and Magnetism in Single-Crystal (Ba,Sr,Ca)Fe_2As_2 Solid Solutions JOHNPIERRE PAGLIONE, K. KIRSHENBAUM, S.R. SAHA, N.P. BUTCH, Center for Nanophysics and Advanced Materials, Department of Physics, University of Maryland, College Park, MD 20742, P.Y. ZAVALIJ, Department of Chemistry and Biochemistry, University of Maryland, College Park, MD 20742, B.G. UELAND, J.W. LYNN, NIST Center for Neutron Research, National Institute for Standards and Technology, Gaithersburg, MD 20899 — Superconductivity in the FeAs-based materials has motivated extensive studies of structural, magnetic and electronic properties of these systems. A common element of the 122 FeAs- based intermetallic series is the occurrence of a simultaneous structural and antiferromagnetic phase transition, which occurs at temperatures ranging between 130 K and 200 K in the Ba, Sr, and Ca-based parent compounds. We present a systematic study of the evolution of the magnetic and structural properties of solid solutions of these parent compounds obtained through electrical transport, magnetic susceptibility, x-ray and neutron scattering measurements of single-crystal samples, discussing the relation between magnetic order and structural aspects through the solid solution series.

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Date submitted: 01 Dec 2009 Electronic form version 1.4