Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Lattice and magnetic instabilities in $CaFe_2As_2$ SHIBABRATA NANDI, ALAN GOLDMAN, Ames Loboratory, US DOE and Iowa State University, DIMITRI ARGYRIOU, Helmholtz-Zentrum Berlin fur Materialien und Energie, BACHIR OULADDIAF, Institute Laue-Langevin, TAPAN CHATTERJI, Forschungszentrum Julich Outstation at Institute Laue-Langevin, ANDREAS KREYSSIG, NI NI, SERGEY BUD'KO, PAUL CANFIELD, ROBERT MCQUEENEY, Ames Loboratory, US DOE and Iowa State University — Neutron diffraction measurements of a high quality single crystal of $CaFe_2As_2$ are reported. A sharp transition was observed between the high temperature tetragonal and low temperature orthorhombic structures at T_S=172.5 K (on cooling) and 173.5 K (on warming). Concomitant with the structural transition we observe a rapid, but apparently continuous, ordering of the Fe moments, in a commensurate antiferromagnetic structure, with a saturated moment of 0.80(5) μ_B/Fe directed along the orthorhombic a-axis. The hysteresis of the structural transition is 1 K between cooling and warming and is consistent with previous thermodynamic, transport and single crystal x-ray studies. The temperature onset of magnetic ordering shifts rigidly with the structural transition providing clearest evidence to date of the coupling between the structural and magnetic transitions in this material and the broader class of arsenides.

Shibabrata Nandi
Ames Loboratory, US DOE and Iowa State University

Date submitted: 21 Nov 2008 Electronic form version 1.4