Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Nuclear and Magnetic structures of $CeFeAs_{1-x}P_xO$ CLARINA DELA CRUZ, PENGCHENG DAI, Univ. of Tennessee and NSSD-ORNL, HERBERT MOOK, NSSD-ORNL, Q. HUANG, M. GREEN, J. LYNN, NIST NCNR, N.L. WANG, G.F. CHEN, J.L. LOU, IPCAS — A new class of superconductors ($RO_{1-x}F_xFeAs$) has been discovered very recently which has resulted to a flurry of activities in the scientific community. Our initial work on the La based parent compound successfully revealed, for the first time, the AFM order which is preceded by a structural distortion from tetragonal to orthorhombic nuclear structures. A model for the magnetic structure was also proposed. Both magnetic order and structural distortion are suppressed in lieu of the superconducting phase. Our systematic study of the doping dependence of both the nuclear and magnetic structure of $CeO_{1-x}F_xFeAs$ as well as in the La system has established the nature of the competition between the static AFM order of the Fe spins and the superconductivity. This work looks at the effects of the tuning of the structural parameters in the compounds without doping carriers into the system. This is motivated by the belief that structurally driven electronic effects are very important in these highly correlated systems. We study the parent compound CeFeAsO and change the particulars about the structural distortion by substituting P on the As site until it's approach to CeFePO which is a nonmagnetic heavy Fermion. We present interesting details of the phase diagram of $CeFeAs_{1-x}P_xO$ with respect to the As/P concentration.

Clarina dela Cruz
Dept. of Physics and Astronomy, Univ. of Tennessee and
NSSD Oak Ridge National Laboratory

Date submitted: 18 Dec 2008 Electronic form version 1.4