## Abstract Submitted for the MAR10 Meeting of The American Physical Society

Magneto-volume effects in the iron-pnictide superconductors<sup>1</sup> D. PARSHALL, Department of Physics and Astronomy, University of Tennessee, Knoxville, TN 37996, JENNIFER NIEDZIELA, Oak Ridge National Laboratory, Oak Ridge, TN 37831; Department of Physics and Astronomy, University of Tennessee, Knoxville, TN 37996, A. SUBEDI, Department of Physics and Astronomy, University of Tennessee, Knoxville, TN 37996, D.J. SINGH, Oak Ridge National Laboratory, Oak Ridge, TN 37831, T. EGAMI<sup>2</sup>, Oak Ridge National Laboratory, Oak Ridge, TN 37831; Depts. of Physics & Astr. and Mat. Science & Engineering, Univ of Tennessee, Knoxville, TN 37996 — The iron-pnictide superconductors display extraordinary sensitivity to the lattice, and in particular to the height (angle) of the pnictogen atom relative to the iron plane. We have developed a Landau theory based upon the magneto-volume effect to explain this phenomenon, and provide experimental evidence to support this interpretation. In addition, we demonstrate a correlation between the local moment predicted by our theory and the superconducting critical temperature. We note that the strong dependence of the iron spin moment on the pnictogen atom height provides one possible mechanism for unconventional electron-phonon coupling. Finally, we provide evidence showing the relationship between negative thermal expansion (which is associated with the magneto-volume effect) and superconducting behavior in these compounds.

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