Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

FORC Evidence for Splitting of the Magnetostructural Transition in $Fe_{1+y}Te$ MILES FRAMPTON, JOHN CROCKER, DUSTIN GILBERT, KAI LIU, RENA ZIEVE, Univ of California - Davis, GENDA GU, Brookhaven National Lab — Iron-based superconductors $Fe_{1+y}Te$ and $CaFe_2As_2$ both have simultaneous magnetic and structural transitions, at 67K and 170K, respectively. We have investigated these transitions using the First-Order Reversal Curve (FORC) method, which provides a detailed mapping of any heterogeneities and irreversible switching events. In this work, electrical resistance FORC measurements have been performed in the presence of external magnetic fields to deconvolute the phase transition. In $Fe_{1+y}Te$ the phase transition actually consists of two separate transitions, which is sensitive to the external field for H $>$ 2T, as revealed by the FORC distribution. The different responses of these separate transitions to the magnetic field suggest that, at a minimum, the coupling to the field is different for each phase. In contrast, $CaFe_2As_2$ shows no sign of a split transition, with or without the magnetic field. In both cases the magnetic field is shown to shift the distribution, suggesting a change in the energy landscape and highlighting the coupling between the magnetic and structural transition. This work has been supported by the NSF (DMR-1008791).

Miles Frampton
Univ of California - Davis

Date submitted: 14 Nov 2014 Electronic form version 1.4