Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Real Space Imaging of the Atomic-Scale Magnetic Structure of $\mathbf{Fe_{1+y}Te}$ PETER WAHL, University of St Andrews, MOSTAFA ENAYAT, ZHI-XIANG SUN, UDAI RAJ SINGH, RAMAKRISCHNA ALURU, STEFAN SCHMAUS, ALEXANDER YARESKO, YONG LIU, CHENGTIAN LIN, Max-Planck-Institut fuer Festkoerperforschung, VLADIMIR TSURKAN, ALOIS LOIDL, JOACHIM DEISENHOFER, Universitaet Augsburg — High temperature superconductivity, both in cuprate as well as iron pnictide materials, occurs in close proximity to magnetically ordered phases, indicating an intimate relationship between the two. Up to now, most information on the magnetic structure of strongly correlated electron systems has been obtained by neutron scattering. Here we demonstrate real space atomic scale imaging of the magnetic structure of iron tellurium ($Fe_{1+y}Te$), the non-superconducting parent compound of the iron chalcogenides, by spin-polarized low temperature scanning tunneling microscopy. Our images of the magnetic structure reveal that magnetic order in the monoclinic phase is truly a unidirectional stripe order, whereas in the orthorhombic phase at higher excess iron concentrations ($y > 0.12$), a transition to a phase with coexistence of stripes in both directions is observed.

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Date submitted: 14 Nov 2014 Electronic form version 1.4