Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Noise Predictions for STM in Systems with Local Electronic Nematic Order ERICA CARLSON, Purdue University, YEN LEE LOH, Ohio State University, KARIN DAHMEN, University of Illinois at Urbana-Champaign — We propose that thermal noise in local stripe orientation should be readily detectable via STM on systems in which local stripe orientations are strongly affected by quenched disorder. Stripes, a unidirectional, nanoscale modulation of electronic charge, are strongly affected by quenched disorder in two-dimensional and quasi-two-dimensional systems. While stripe orientations tend to lock to major lattice directions, dopant disorder locally breaks rotational symmetry. In a host crystal with otherwise C4 rotational symmetry, stripe orientations in the presence of quenched disorder map to the random field Ising model. While the low temperature state of such a system is generally a stripe glass in two dimensional or strongly layered systems, as the temperature is raised, stripe orientational fluctuations become more prevalent. We propose that these thermally excited fluctuations should be readily detectable in scanning tunneling spetroscopy as telegraph noise in the high voltage part of the local I(V) curves. We predict the spatial, temporal, and thermal evolution of such noise, including the circumstances under which such noise is most likely to be observed. In addition, we propose an in-situ test for assessing whether such noise is due to correlated fluctuations rather than independent switchers.

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Date submitted: 08 Dec 2008 Electronic form version 1.4