Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Can STM detect nematic ordering in underdoped $Bi_2Sr_2CaCu_2O_{8+x}$ or other correlated systems?[1] EDUARDO DA SILVA NETO, PEGOR AYNAJIAN, Princeton University, SHIMPEI ONO, CRIEPI, Japan, RYAN BAUMBACH, ERIC BAUER, Los Alamos National Laboratory, JOHN MYDOSH, Kamerlingh Onnes Laboratory, Leiden University, ALI YAZDANI, Princeton University — Electronic nematic phases, where, for example, the electronic states undergo a spontaneous four-fold (C_4) to two-fold (C_2) symmetry breaking, have recently gained vast interest as a possible candidate for various hidden order states in several correlated electron systems such as cuprates, pnictides, and heavy fermions. Such states are difficult to detect using non-local probes because of possible twin domain structures in macroscopic samples. STM spectroscopy has been proposed as a possible approach to detect such nematic orders, with several recent experiments reporting signals in the cuprates and iron-based superconductors. We specifically investigate the situation in which STM topographic data shows C_4 symmetry while energy-resolved spectroscopic maps signal C_2 symmetry. We find that such behavior can in fact occur for asymmetric tip geometries and discuss both model calculations and experimental results that provide evidence for this false nematic signature. We discuss possible future STM experiments that could unambiguously detect electronic nematic order.

[1]Work supported by the Office of Basic Energy Science of the DOE and NSF-DMR.

Eduardo da Silva Neto
Princeton University

Date submitted: 13 Nov 2012 Electronic form version 1.4