Abstract Submitted for the MAR10 Meeting of The American Physical Society

Anomalous Noise in the Pseudogap Regime of YBa₂Cu₃O_{7-\delta}¹ VLADIMIR ORLYANCHIK, University of Illinois at Urbana Champaign, DAVID S. CAPLAN, MICHAEL B. WEISSMAN, DALE J. VAN HARLINGEN, EDUARDO H. FRADKIN, University of Illinois at Urbana Champaign, MICHAEL J. HINTON, THOMAS R. LEMBERGER, Ohio State University — The pseudogap regime of high temperature superconductors is usually associated with electronic correlations (e. g. charge stripes). In symmetry-broken correlated systems, slow switching between different configurations contributes to low-frequency noise. Transport noise measurements performed in underdoped YBCO and Ca-doped YBCO thin films reveals a well-defined temperature of order 250K below which an extra noise component sets in that exhibits sensitivity to magnetic fields, aging effects, and large discrete fluctuators. Such effects are characteristic of noise from collective states in disordered systems. The noise onset temperature varies with measurement frequency but is only weakly doping-dependent. To explain this behavior, we speculate on a model involving thermally-activated motion of charge stripes partially pinned to underlying magnetic order.

¹Work supported by U.S. DOE under grants DE-FG02-07ER46453 and DE-FG02-08ER46533; and by NSF under grant DMR-0605726

Vladimir Orlyanchik University of Illinois at Urbana Champaign

Date submitted: 19 Nov 2009 Electronic form version 1.4