Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Electronic friction at the atomic scale: Conduction, electrostatic and magnetic effects[1] JACQUELINE KRIM, North Carolina State University — We have performed a magnetic probe microscopy study of levitation and atomic-scale friction for Fe on YBCO (Tc = 92.5K) in the temperature range 65 - 293 K, to explore electronic contributions to friction at the atomic scale. The samples were prepared with oxygen-depleted surfaces, with thin semiconducting surface layers present atop the bulk. Below Tc, the friction coefficient was observed to be constant at 0.19 and exhibited no correlation with the strength of superconducting levitation forces observed below Tc. The friction coefficient exhibited a change in slope within experimental error of Tc that increased progressively above Tc and reached 0.33 by room temperature. The results were analyzed within the context of underlying atomic-scale electronic and phononic mechanisms that give rise to friction we conclude that contact electrification and static electricity play a significant role above Tc.

[1] I. Altfeder and J. Krim, J. Appl. Phys. (2012) **111** (9), art#094916 (2012)

[1]Supported by NSF and AFOSR.

Jacqueline Krim
North Carolina State University

Date submitted: 07 Feb 2013 Electronic form version 1.4