Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Cryolubricity of YBCO powder deposits KEELEY M. STEVENS, JACQUELINE KRIM, North Carolina State University — Motivated by recent reports of superconductivity-dependent friction [1] in macroscopic pin-on-disk measurements of steel on YBCO, [2] we have investigated the tribological properties of YBCO powder deposits on metal electrodes of a quartz crystal microbalance (QCM). Measurements are performed as a function of temperature over the range 80 - 300K, by monitoring the frequency and amplitude of the QCM both in the presence and absence of adsorbed nitrogen film layers. A pulsed magnetic field was applied to isolate the effect of superconductivity at and around the transition temperature. The powder deposits produce negative shifts in the QCM fundamental frequency, an indication of the strength of their attachment to the surface. The shifts exhibit structure as the temperature passes through the superconducting transition temperature, but the presumed drop in friction is not so large as to produce a decoupling effect which would lead to positive shifts. [3] Measurements on alternate QCM electrodes in the presence of adsorbed film layers are ongoing and will be reported on. Funding provided by NSF DMR.

[1] Highland, M. and Krim, J. *Phys. Rev. Lett.* **2006,** 96, 226107.
[2] Ding, Q. et al. *Wear* **2008,** 265, 1136.
[3] Dybwad, G.L. *J. Appl. Phys.* **1985**, 58, 2789.

Keeley M. Stevens
North Carolina State University

Date submitted: 28 Nov 2009 Electronic form version 1.4