

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Atomic Friction Studies of Nitrogen and Oxygen Uptake on Magnetic substrates by means of the Quartz Crystal Microbalance Technique¹

ZACHARY FREDRICKS, KEELEY STEVENS, JACQUELINE KRIM, North Carolina State University — In the study of friction at the nanoscale, phononic, electrostatic, conduction electron and magnetic effects all contribute to the dissipation mechanisms [1]. Magnetic contributions have been alluded to in past studies, but remain poorly characterized. We will report here our efforts to detect magnetic friction for sliding adsorbed films on various magnetic films substrates in the presence and absence of an external field. Using a quartz crystal microbalance (QCM), we record the sliding friction of liquid monolayers of nitrogen, a diamagnetic material, as well as liquid oxygen, a paramagnetic material, on nickel alloy and graphene/nickel surfaces. In the prior literature, these systems have been reported to exhibit sensitivity to external fields.

[1] I. Altfeder and J. Krim, J. Appl. Phys. (2012)

[2] Highland et al., PRL (2006)

¹Funding provided by NSF DMR.

Jacqueline Krim
North Carolina State University

Date submitted: 28 Nov 2012

Electronic form version 1.4