Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Friction and Sliding of Polystyrene Micro Spheres in the Presence and Absence of Capillary Adhesion[1] IYAM LYNCH, JACQUELINE KRIM, North Carolina State University — Quartz crystal microbalance (QCM) response to varying load geometries, particularly micro particles, is a rapidly growing field of research.[2,3] This no doubt is due to its varied applications involving the study of textiles, DNA and viruses[3], micro adhesion[2,3], micro sorting[3], and friction. There are many challenges that must be overcome in this field. One major difficulty is capillary adhesion, which is difficult to quantify. We have created an experiment to greatly reduce the impact of capillary adhesion by employing the shaking motion of a 5MHz QCM to eject micro spheres (15μm) from its surface, which subsequently land on the surface of a nearby 8 MHz QCM. The experiment is performed in a vacuum chamber to include different environments such as air, vacuum, and dry nitrogen. During the experiment we monitor the behavior of the unloaded QCM by measuring the change in frequency and quality factor as a result of the newly landed spheres. Particle motion and dynamics are observed using a microscope with a camera attached.

[1]We would like to acknowledge NSF and NTC for funding this project.
[2]Dybwad, G.L. J. Appl. Phys. **1985**, 58, 2789
[3]Dultsev, F.N. et al. Langmuir **2000**, 16, 5036.

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Date submitted: 26 Nov 2010 Electronic form version 1.4