Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Static and dynamic friction in sliding colloidal monolayers[1] ANDREA VANOSSI, CNR-IOM Democritos and SISSA, Trieste, Italy, NICOLA MANINI, Dipartimento di Fisica, Universita‘ di Milano, Italy, ERIO TOSATTI, SISSA, CNR-IOM Democritos and ICTP, Trieste, Italy — In a recent experimental breakthrough, the controlled sliding of 2D colloidal crystals over perfectly regular, laser generated periodic or quasi-periodic ‘corrugation‘ potentials has been realized in Bechinger's group [1]. Based on realistic MD simulations which reproduce the main experimentally observed features, we explore the potential impact of colloid monolayer sliding in nanotribology [2]. The free motion of edge-spawned kinks and antikinks in smooth incommensurate sliding is contrasted with the kink-antikink pair nucleation at the large static friction threshold in the commensurate case. The Aubry pinning/depinning transition is also demonstrated, e.g., as a function of the corrugation amplitude. Simulated sliding data allow the extraction of frictional work directly from particles coordinates and velocities as a function of classic friction parameters, primarily speed, and corrugation strength. Analogies with sliding charge-density waves, driven Josephson systems, sliding of rare gas islands, and other novel features suggest further experiments and insights, which promote colloid sliding to a novel friction study instrument [3]. [1]T. Bohlein et al, Nature Mat. 11, 126 (2012) [2]A. Vanossi et al, PNAS 109, 16429 (2012) [3]A. Vanossi, E. Tosatti, Nature Mat. 11, 97 (2012)

[1]Research partly sponsored by Sinergia Project CRSII2 136287/1.

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Date submitted: 08 Nov 2012 Electronic form version 1.4