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Dragging shadows causes real friction: sliding Moire' patterns A. VANOSSI, CNR-INFM S3 and Physics Dept., Modena University, Italy, C. NEGRI, N. MANINI, Physics Dept. and CNR-INFM, Milan University, Italy; SISSA and INFM-CNR Democritos, Trieste, Italy, G.E. SANTORO, E. TOSATTI, SISSA, INFM-CNR Democritos, and ICTP, Trieste, Italy — Surface Moire' patterns are shadow-like modulations (kinks) which form at crystalline overlayers that are out of registry with their substrates. They were hardly considered in the context of friction so far; we here argue that they can be relevant. 1D model calculations suggest in fact that under the action of an external slider, the kinks are the real objects being rigidly dragged, as opposed to the real particles, which are not [1]. For a crystalline periodic slider, we predict peculiar phenomena on the fly caused by the pinning/depinning of the kink lattice to the slider, in full analogy with the well known real lattice static counterpart [2]. The frictional dissipation by a vibrating and/or sliding AFM probe should moreover be enhanced at the kinks, where atoms take poorly stable positions. Thus, AFM frictional maps [3] should reveal with much more contrast the Moire' patterns than topographic maps of the same patterns. This concept is demonstrated by means of a simple model, which also provides a guide to the key parameters determining the enhancement. [1] A. Vanossi et al., PRL 97, 056101 (2006). [2] A. Vanossi et al., PRL 99, 206101 (2007). [3] C. Loppacher et al., PRB 62, 13674 (2000).

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