

Abstract Submitted
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Study of nano-scale kinetic friction using vortices in superconductors and charge-density waves A. MAEDA, Y. INOUE, H. KITANO, Department of Basic Sciences, University of Tokyo, S. SAVELEV, F. NORI¹, Frontier Reserach System, RIKEN, I. TSKADA, Central Research Institute of Electric Power Insdustry, S. OKAYASU, Japan Atomic Research Institute — In analogy with the standard macroscopic friction in massive blocks, we present a comparative study of the friction force felt by moving quantized vortices in high- T_c superconductors and charge-density waves (CDWs). Using $I-V$ characteristic measurement and a model for this data, our observations: (1) provide a link between friction at the micro- and macroscopic scales; (2) explain the roundness of the static-kinetic friction transition in terms of system sizes (critical-phenomena view) and thermal fluctuations; and (3) explain the crossing of the kinetic friction F_k versus velocity v for our pristine (high density of very weak defects) and our columnar-defect-irradiated samples (with lower density of deeper pinning defects). We will also investigate any possibilities of the observation of the scaling relation between the velocity dependence of the kinetic friction and the waiting time dependence of the static friction in these systems.

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