

Abstract Submitted
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Interacting particles ratchet effect: Experiments and theoretical simulations.¹ JOSE L. VICENT, NURIA O. NUNEZ, Departamento Fisica Materiales, Universidad Complutense, 28040 Madrid (Spain), LUIS DINIS, JUAN M. R. PARRONDO, Departamento Fisica Atomica, Molecular y Nuclear, Universidad Complutense, 28040 Madrid (Spain), JOSE V. ANGUIA, Instituto Microelectronica Madrid, CSIC, 28670 Madrid (Spain) — Ratchet effect occurs when out of equilibrium particles move on asymmetric potentials. The outcome is a net motion without the need of being driven by non-zero average forces or temperatures gradients. This effect spans in Nature for example from molecular motors to particles separation. Most of the theoretical models have dealt with non-interacting particles. From the experimental point of view superconducting vortices are a powerful tool to study ratchet effect on interacting particles. We will present the experimental behavior of vortex lattice motion on asymmetric pinning potentials, when the asymmetric potentials are modified and extensive simulations of a two-dimensional gas of vortices in an asymmetric substrate. We simulate the vortices as Langevin particles interacting by means of a repulsive potential. The defects in the substrate are simulated as potential wells for the Langevin particles. We will analyse the experimental data in comparison with the simulations when the shape and periodicity of the asymmetric potentials are varied.

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