Data: 20 aprile 2012

Ora: 14:00

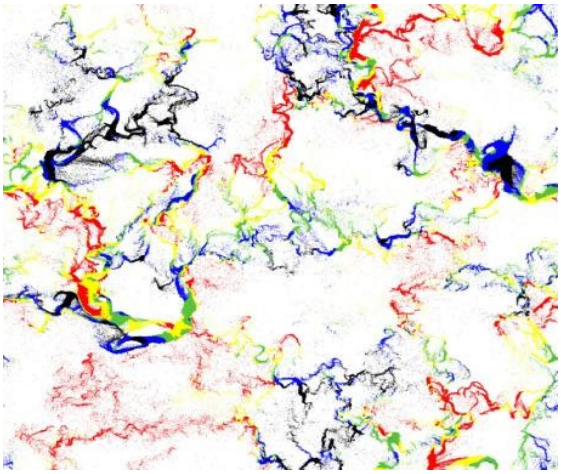
CNR IENI
sala riunioni Q4P16
via R. Cozzi, 53
20125 Milano

GRANULAR BROWNIAN RATCHET

Consiglio Nazionale delle Ricerche
Istituto per l'Energetica e le Interfasi
U.O.S. di Milano

propone il seminario sul tema

Granular Brownian Ratchet



Dr. Giulio Costantini

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Granular materials have been the subject of intense research in the last 20 years in physics. Most of the non-trivial phenomena that can be observed in a shaken box of sand are due to the inelasticity of collisions among grains. Kinetic energy is dissipated into heat, introducing an intrinsic time irreversibility in the "microscopic" dynamics which can have consequences at a more macroscopic level: for instance species segregation, breakdown of energy equipartition, apparent Maxwell-demon-like properties such a heat currents against a temperature gradient or mass current against a density gradient, ratchet-like net, drift of an asymmetrically shaped tracers, and so on. A Brownian ratchet is a system designed to extract work from a thermal bath. The second principle of thermodynamics establishes that this device, if it is at equilibrium, must be coupled to different baths at different temperatures in order to obtain a noise rectification. The breakdown of the time-reversal symmetry leads to simple models of inelastic Brownian ratchets that are coupled to only one thermal bath at a single temperature.
Both approaches agree on the value of the upper-critical field, that distinguishes the ferromagnetic and bubble phases.
Surprisingly, the predicted simple aging at zero field is observed in the simulations, where a logarithmic growth is found in contrast with the predicted power-law growth.

Per Informazioni

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