Abstract Submitted
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Behavior of a charged particle in contact with a chaotic thermostat[1] G, J, MORALES, UCLA — A chaotic thermostat has been developed that extends the familiar Langevin model, in which transport results from an uncorrelated random force, to the domain of deterministic dynamics. The concept is based on supplementing the friction force of a deterministic thermostat (e.g., Nose-Hoover) with a self-consistent fluctuating force associated with coupling to the heat bath. The new system exhibits diffusive behavior, achieves symmetric Maxwellian distributions, and in the unmagnetized case, it satisfies the Einstein relation when a DC electric field is applied. The magnetized charge exhibits Hall and Pedersen mobilities with erratic variations around the predictions of the Langevin model. Significantly, the cross-field diffusion coefficient shows a non-monotonic dependence on the strength of the magnetic field, and absolute negative mobility (ANM) arises over a small range of magnetic field values. The application of a coherent AC field is found to reduce the zero-order chaotic transport.

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