

Abstract Submitted
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Self-diffusion and random motion in a strongly-coupled dusty-plasma: MD simulation¹ JOHN GOREE, BIN LIU, Dept. of Physics & Astronomy, The Univ. of Iowa, ZOLTAN DONKÓ, PETER HARTMANN, Research Institute for Solid State Physics and Optics of the Hungarian Academy of Sciences, Budapest, Hungary — A dusty plasma as in the accompanying talk by Liu and Goree is modeled as a 2D Yukawa system, with particles that are constrained to move on a plane and interact with a potential $U(r) = Q \exp(-r/\lambda_D)/r$, where Q is particle charge and λ_D is a screening length. We performed two independent molecular dynamics (MD) simulations that are frictionless and under equilibrium conditions, unlike the experiment, which is nonequilibrium driven-dissipative and anisotropic. As in the experiment, we tested the long-time behavior of MSD and VACF. We tested the choice of system size and thermostat on the characterization of diffusion. We compare the simulation MSD to the experiment, finding a match in the ballistic limit, but not in the diffusion limit. The MSD is much more superdiffusive in the simulation than in the experiment. For both the simulation and experiment, motion obeys Gaussian statistics at high T , but not at low T .

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