Abstract Submitted
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Numerical studies of energy transport in dusty plasma monolayer[1] RAHUL BANKA, EMERSON GHER, EVDOKIYA KOSTADINOVA, LORIN MATTHEWS, TRUELL HYDE, JOSHUA PADGETT, CONSTANZE LIAW, Baylor University — Here we present a many-body simulation of a dusty plasma monolayer in the moderate coupling (liquid) regime, where coplanar and out-of-plane laser perturbations result in the excitation of instabilities. The goal of this study is to determine how the energy dissipation throughout the structure is linked to the presence of anomalous dust particle diffusion. Different diffusion regimes are simulated using a numerical thermal bath which provides 'kicks' of various strength and direction to each dust grain. Modified Gaussian and Lévy distributions are employed as probability distribution functions for these kicks, which allows us to model both local and nonlocal interactions with gas and plasma particles. For each set of parameters, the observed relation between global dynamics and dust diffusion is verified against the predictions of the Fractional Laplacian Spectral code, which calculates the probability for energy transport as a function of random defects and nonlocal interactions in the medium. These phenomena are also compared to video data from experiments performed in the CASPER lab at Baylor University.

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