Spectral Approach to Particle Transport in Turbulent Dusty Plasma[1] EVDOKIYA KOSTADINOVA, Baylor University, JOSHUA PADGETT, Texas Tech University, CONSTANZE LIAW, University of Delaware, LORIN MATTHEWS, TRUELL HYDE, Baylor University — Here we present a recently developed analytical approach where the onset of turbulence in dusty plasma is investigated using mathematical methods from spectral theory and fractional calculus. Specifically, we compute the time-evolved distribution of the system energy as a function of disorder concentration and strength of nonlocal interactions within the medium. In this study, disorder is determined from the stochastic fluctuations of the dust charge, while the nonlocal effects are obtained from the density distributions of the plasma species. The predictions from the proposed spectral analysis are compared against results from molecular dynamics simulations and laboratory experiments of dusty plasmas generated under similar system conditions. We also discuss the application of the spectral approach to dust particle transport in edge plasma turbulence.

Evdokiya Kostadinova
Baylor University

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