Abstract Submitted
for the OSF07 Meeting of
The American Physical Society

Computational study of nonlinear waves in 2d complex plasma
M.J. GAREE, T.E. SHERIDAN, Physics, Ohio Northern University — We have developed a one-dimensional, nonlinear model for dust- acoustic waves in a two-dimensional complex plasma. In this model, dust particles with identical charge and mass reside on a periodic triangular lattice. Particles interact through a shielded Coulomb force and are allowed to move only in one direction. This model is solved computationally. The dispersion relation found by solving the model for small-amplitude waves is in good agreement with the theoretical dispersion relation. Simulations of large- amplitude unipolar pulses are currently being undertaken with the goal of comparing our model to the predictions of Korteweg-de Vries (KdV) soliton theory. This comparison focuses on two main attributes of KdV solitons: proportionality between wave speed, amplitude, and width; and conservation of waveform during soliton collisions. Recent results will be discussed.

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Date submitted: 28 Sep 2007 Electronic form version 1.4