

Abstract Submitted  
for the OSF08 Meeting of  
The American Physical Society

**Observation of quasi-periodic route to chaos in driven dusty plasma** W.L. THEISEN, T.E. SHERIDAN, Ohio Northern University — Chaotic dynamics have previously been observed in a driven dusty plasma with three particles [T. E. Sheridan, *Phys. Plasma* **12**, 080701 (2005)] due to a resonance overlap between the center-of-mass and breathing modes. In the present work, the transition to chaos in this system is characterized as a function of driving amplitude for two different driving frequencies. In the first case, the driving frequency is matched to the frequency minimum of the Arnold tongue, while in the second case, the driving frequency is slightly above this value. Dynamics are characterized by the power spectrum, Lyapunov exponent, and correlation dimension, as a function of driving amplitude. For the higher driving frequency we observe asymmetric spectral sidebands at intermediate driving amplitudes, a clear indication of quasi-periodic dynamics. For large driving amplitudes the dynamics become chaotic.

Terry Sheridan  
Ohio Northern University

Date submitted: 18 Sep 2008

Electronic form version 1.4