

Abstract Submitted
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Laboratory observations of self-excited dust acoustic shock waves¹ ROBERT L. MERLINO, JONATHON R. HEINRICH, SU-HYUN KIM, University of Iowa — Dust acoustic waves have been discussed in connection with dust density structures in Saturn's rings and the Earth's mesosphere, and as a possible mechanism for triggering condensation of small grains in dust molecular clouds. Dust acoustic waves are a ubiquitous occurrence in laboratory dusty plasmas formed in glow discharges. We report observations of repeated, self-excited dust acoustic shock waves in a dc glow discharge dusty plasma using high-speed video imaging. Two major observations will be presented: (1) The self-steepening of a nonlinear dust acoustic wave into a saw-tooth wave with sharp gradient in dust density, very similar to those found in numerical solutions [1] of the fully nonlinear fluid equations for nondispersive dust acoustic waves, and (2) the collision and confluence of two dust acoustic shock waves.

[1] B. Eliasson and P. K. Shukla, Phys. Rev. E 69, 067401 (2004).

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