

Abstract Submitted
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Precursor solitons in a flowing complex (dusty) plasma SURABHI JAISWAL, PINTU BANDYOPADHYAY, ABHIJIT SEN, Institute for Plasma Research — We report the first experimental observation of precursor solitons in a flowing dusty plasma. The nonlinear solitary dust acoustic waves (DAWs) are excited by a supersonic mass flow of the dust particles passing over an electrostatic potential hill. In a frame where the fluid is stationary and the hill is moving the solitons propagate in the upstream direction while wake structures consisting of linear DAWs are seen to propagate in the downstream direction. The experiments have been carried out in a Π -shaped Dusty Plasma Experimental (DPEX) device where kaolin particles are immersed in a DC discharge argon plasma to form the dusty plasma and a floating wire mounted on the cathode creates a potential hill. The dust flow is induced by sudden changes in the hill height and the solitary structures are seen only for supersonic flows and up to an upper limit of the flow. A theoretical model description of the phenomenon will be provided and some practical implications of such precursor excitations for a charged object moving in a plasma will be discussed.

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