

Abstract Submitted
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Theory of arbitrary amplitude dust ion-acoustic shock waves in a multi-ion dusty plasma¹ A.A. MAMUN, Jahangirnagar University, Dhaka, Bangladesh, BENGT ELIASSON, PADMA K. SHUKLA, Ruhr-University Bochum, Germany — We present a theory for arbitrary amplitude dust ion-acoustic shock waves in a multi-ion dusty Plasma, composed of electrons, light positive ions, heavy negative ions, and stationary massive dust grains. For this purpose, the coupled Poisson and dust-charging equations, which accounts for the fluctuation of charges on static dust, is solved numerically. We find that large amplitude shocks are associated with a sudden decrease of the electrostatic potential and of the dust grain charge. In the lower speed limit small amplitude shocks, which are smoother in space, are formed, but in the larger speed limit large amplitude shocks with sharper fronts are formed. It is anticipated that the profiles and amplitudes of the DIA shocks predicted here will be observed in forthcoming laboratory and space experiments.

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