

Localized nonlinear excitations in dusty plasma crystals ¹

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The nonlinear aspects of horizontal (longitudinal, acoustic mode) as well as vertical (transverse, optical mode) motion of charged dust grains in a dusty plasma monolayer are discussed. Different types of localized excitations, predicted by nonlinear wave theories, are reviewed and conditions for their occurrence (and characteristics) in DP crystals are discussed. Dust crystals are shown to support nonlinear kink-shaped supersonic solitary excitations [1], related to longitudinal dust grain displacement, as well as modulated envelope localized modes associated with either longitudinal [2] or transverse [3, 4] oscillations. The effect of mode- as well as layer-coupling is considered. The relation to previous results on atomic chains as well as to experimental results on strongly-coupled dust layers in gas discharge plasmas is discussed.

References

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