

**Nonlinear Structures in Dusty Plasmas with Different Kinds of Distributions**

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The existence of nonlinear structures (e.g., solitons, shocks, double layers, and rogue waves) in different plasma environments have been reported theoretically as well as experimentally by a number of researchers. Over the last many years, there has been a considerable interest to carry out research work for the existence and study of the different kinds of nonlinear structures in dusty plasma. It is established that different kinds of stationary nonlinear localized structures such as dust acoustic waves, dust-ion acoustic waves etc. exist in dusty plasmas. Focusing on nonlinear excitations, it is well known that presence of dust may modify their properties. This is shown either by a reductive perturbation method (to study small amplitude structures) or by Sagdeev pseudopotential approach (to study large amplitude excitations). We have also studied the envelope solitary structures and rogue waves which are governed by the different solutions of NLSE. Some problems are carried out in dusty plasmas in the frame work of different kinds of distributions to analyse the effects of physical parameters on the characteristics of dust acoustic and dust ion acoustic solitary structures, shock structures and rogue waves. These nonlinear structures are influenced by the various plasma parameters of the given dusty plasma systems. The findings of the various studies may be useful in understanding the nonlinear structures in different plasma environments. A brief review focusing on this work will be presented.

References

- [1] N. S. Saini and I. Kourakis, *Phys. Plasmas* **15**, 123701 (2008)
- [2] N. S. Saini, I. Kourakis and M. A. Hellberg, *Phys. Plasmas* **16**, 062903 (2009)
- [3] N. S. Saini and Shalini, *Astrophys. Space Sci.* **346**, 155 (2013)
- [4] N. S. Saini and K. Singh, *Phys. Plasmas* **23**, 103701 (2016)