

# NONLINEAR SOLITARY WAVES IN DUSTY PLASMAS WITH CHARGE FLUCTUATIONS

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## ABSTRACT

In dusty plasmas the charge on a moving dust grain changes in response to the variations in the local plasma conditions. The charge on a slowly moving grain should be close to a locally determined equilibrium. For a time independent electrostatic structure an integral of motion for a grain with varying charge can then be found. Solutions of Vlasov's equation are given by arbitrary functions of these integrals of motion, so that, using the Poisson equation, a generalised Sagdeev (Classical) potential can be found (Raadu, 2003, Phys. Scripta vol.68, 266). Solitary wave solutions may be investigated making use of this generalised Sagdeev potential. The influence of charge fluctuations on the range of parameters for the existence of solitary waves is considered here. A modified form of the amplitude dependence of the velocity is found.