

# Accepted Manuscript

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PII: S0032-0633(17)30235-0

DOI: [10.1016/j.pss.2017.10.013](https://doi.org/10.1016/j.pss.2017.10.013)

Reference: PSS 4415

To appear in: *Planetary and Space Science*

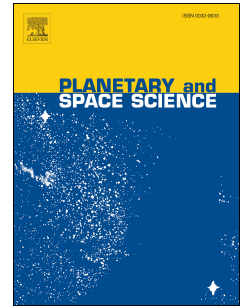
Received Date: 30 June 2017

Revised Date: 26 September 2017

Accepted Date: 21 October 2017

Please cite this article as: Arshad, K., Lazar, M., Poedts, S., Quasi-electrostatic twisted waves in Lorentzian dusty plasmas, *Planetary and Space Science* (2017), doi: 10.1016/j.pss.2017.10.013.

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# Quasi-electrostatic twisted waves in Lorentzian dusty plasmas

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## Abstract

The quasi electrostatic modes are investigated in non thermal dusty plasma using non-gyrotropic Kappa distribution in the presence of helical electric field. The Laguerre Gaussian (LG) mode function is employed to decompose the perturbed distribution function and helical electric field. The modified dielectric function is obtained for the dust ion acoustic (DIA) and dust acoustic (DA) twisted modes from the solution of Vlasov-Poisson equation. The threshold conditions for the growing modes is also illustrated.

*Keywords:* Orbital angular momentum, Laguerre Gaussian, Lorentzian, Helical, Kinetic theory

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## 1. Introduction

Charged dust particles and dusty plasmas are ubiquitous in cosmic and astrophysical environments (Vladimirov et al., 2005) like interstellar-media, molecular dusty clouds, star forming dust clouds, Eagle nebula, and supernovae remnants, our solar system (Mann et al., 2011) such as planetary rings systems and interplanetary media due to the presence of cometary dust particles, Jupiter's dusty rings (Hamilton and Kruger, 2008), cometary nuclei (Patzold et al., 2008) and Earth's mesosphere (Knappmiller et al., 2011). Most of such studies are based on the unrealistic (planar) electric field. Shukla 2010, predicted dusty

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