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A Comparative study of Eletromagnetic instabilities in a Lorentzian dusty plasma[1] NAZISH RUBAB, NIKOLAI ERKAEV, DANIEL LANGMAYR, HELFRIED BIERNAT, Space Research Institute, Austrian Academy of Sciences, Schmiedlstrasse 6, A-8042 Graz, Austria — This study presents a theoretical approach to analyze the infuence of kappa distributed streaming ions and magnetized electrons on the plasma wave propagation in a dusty plasma. In particular, analytical expressions under certain conditions are derived for various fundamental instabilities and modes of propagations. A dispersion relation for kinetic Alfvén wave (KAW)-like streaming instability has been derived. The effects of dust particles, plasma beta β_i, Lorentzian index on the growth rates and the threshold streaming velocity for the excitation of the KAW instability are examined. It has been observed that a sufficient amount of dust grains introduce two instabilities; one near cut-off frequency and the other below electron cyclotron frequency. Further, a comparative study of electromagnetic waves propagating along and across the external magnetic field has been made. Possible applications to various space and astrophysical situations are discussed.

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