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Kinetic study of two temperature twisted ion acoustic waves

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The electrostatic Twisted Ion Acoustic Wave (TIAW) with two components (hot and cold) of positive ions having distinct finite Orbital Angular Momentum (OAM) states is investigated in an un-magnetized collision less electron-ion plasma. The Vlasov-Poisson coupled set of equation is used for the analysis of dynamics of TIAW. The Laguerre Gaussian solutions are employed on perturbed quantities owing to the helical phase structures. The dispersion properties and Landau damping rates of TIAW are analyzed both analytically and numerically. It is found that wave frequency and Landau damping rate are significantly modified in the presence of finite states of OAM. It is shown that twist parameter, hot to cold ion density and temperature ratios have significant influence on damping rate and wave frequency. The result will be useful in considering laser matter interaction and particle transport in laboratory plasmas.

Biography

Muhammad Rafique has completed his PhD from Pakistan Institute of Engineering and Applied Sciences and Postdoctoral studies from University of Michigan, USA. He is the Director of Quality Enhancement Cell at the University of Azad Jammu and Kashmir, also he has served as Chairman/HOD of the Department of Physics from 2013 to 2016. He has published more than 100 papers in reputed journals and has been serving as an Editorial Board Member of repute.

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