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Stability Dynamics Of Non¬-thermal Solar Plasma Fluctuations In Turbu-magnetized GES Model Framework

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A laboratory plasma-wall interaction-based astrophysical gravito-electrostatic sheath (GES) model, which has originally been reported to investigate the solar surface emission mechanism of the solar wind, is herein methodologically applied to analyze the dynamic stability of the entire non-thermal solar plasmas. The effects of non-thermality, fluid turbulence, and magnetic pressure are simultaneously considered in the formulation of the original GES structure equations. Accordingly, the entire GES-based solar plasma system, which is an amalgamation of the self-gravitating subsonic solar interior plasma (SIP, bounded) and non-gravitating supersonic solar wind plasma (SWP, unbounded), is destabilized relative to the GES equilibrium. Application of normal spherical perturbation mode ansatz herein divulges the evolution of both dispersive and non-dispersive modal features of the modified GES collective wave excitations dictated by a distinct pair of linear dispersion laws on both the SIP and SWP scales. The utmost reliability of the proposed dispersion laws is concretized with the help of an exact dispersion shape matching with the previous results available in the literature. It is herewith inferred that the thermostatistical GES stability depends mainly and sensitively on the magnetic field, plasma density, and plasma temperature. A numerical platform illustrates the various especial stability properties of the plasma fluctuations. It is demonstrated with the help of both color and line profiles. It is speculated that dispersive features are more pronounced in the gravitational domains (SIP) against the electrostatic ones (SWP), and so forth.

Biography

Mr. Souvik Das has done his M.S., Ph.D. Experimental High Energy Physics at Cornell University August 2010 and B.Sc. Honor's Physics University of Delhi, St. Stephen's College July 2003.

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