

Seminar

Institute for Plasma Research

Title: Excitation of Ion-Acoustic Soliton in a Quiescent Plasma Confined by Multi-Pole Line Cusp Magnetic Field

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Date: 01st December 2023 (Friday)

Time: 10:30 AM

Venue: Seminar Hall, IPR

Abstract

Ion acoustic solitons (IASs)—the self-organized, non-linear localized structures that can propagate long distances—are widely studied in astrophysical and laboratory plasmas to understand their non-linear dynamics that describe several fundamental processes of plasma physics. The experimental observations and characterization of Ion Acoustic Solitons (IASs) in a plasma confined by multi-pole line cusp magnetic field has been studied. The magnitude of pole cusp magnetic field can be varied by varying currents in the electromagnets. In addition, by varying the magnitude of the pole-cusp magnetic field, the proportion of the two-electron-temperature components in the filament-produced plasmas can be varied. The solitons are experimentally characterized by measuring their amplitude-width relation and Mach numbers. The nature of the solitons is further established by making two counter-propagating solitons interact with each other. Later, the effect of the two-temperature electron population on soliton amplitude and width is studied by varying the magnitude of the pole cusp-magnetic field. It has been observed that different proportions of two-electron-temperature significantly influence the propagation of IASs. The amplitude of the solitons has been found to be inversely proportional to the effective electron temperature (T_{eff}).
