Seminar

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Institute for Plasma Research

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Title: Experiments on the plasmas confined by Multi-pole line cusp Plasma Device (MPD)

Speaker: Dr. Shaikh Zubin Abdulfarid
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Date: 03rd December 2024

Time: 4:00 PM

Venue: Seminar Hall, IPR

Abstract

The Multi-pole line cusp Plasma Device (MPD) is a unique plasma device, in which the magnitude of the pole-cusp magnetic field can be varied. In addition by varying the magnitude of the pole cusp magnetic field, the proportion of two-electron temperature components in filament produced plasmas confined by multi-pole line cusp magnetic field of MPD can be varied. Leveraging the unique features of MPD, the effect of two-temperature electrons on nonlinear Ion-Acoustic wave has been studied experimentally. The nonlinear ion acoustic waves are excited and characterized by measuring the Mach number and amplitude-width relation. The nature of the waves are further established by making two counter-propagating waves interact with each other. Later, the effect of the two-temperature electron population on 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 amplitude and width of the propagating wave. The amplitude of the waves has been found to be inversely proportional to the effective electron temperature. The result of these study and new experimental results will be discussed in detail along with possible explanation.

Plasma has been produced and confined by these multi-pole line cusp magnetic field, this confinement study by varying the number of pole cusp and pole strength. Different magnetic configuration has been produced to simulate the high energetic electrons interaction with weak magnetic field. In addition to that the design modification for the plasma source of the contact ionized plasma has been suggested and will be discussed.

References

A.D. Patel, M. Sharma, N. Ramasubramanian, R. Ganesh, and P.K. Chattopadhyay, Rev. Sci. Instrum. **89**, (2018).

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