Seminar

Institute for Plasma Research

Title : Excitation of an ion acoustic soliton in quiescent Argon plasma confined by Multi-pole cusp magnetic field

Speaker: Dr. Amitkumar Patel
Institute for Plasma Research, Gandhinagar

Date : 10th February 2021 (Wednesday)

Time : 03:30 PM

Venue : Online - Join the talk: https://meet.ipr.res.in/Amit_PDF_extension_talk

Abstract :

A multi-pole line cusp magnetic field plasma device (MPD) has capability to confine quiescent plasma volume having density fluctuation level less (δn/n ¿ < 1% and suitable for active experiments of plasma i.e. plasma perturbation studies [1, 2]. Initially we start to excite the small amplitude ion acoustic wave plasma in the quiescent Argon plasma confined by Multi-pole cusp magnetic field. The experimental results shows that the velocity of IAW under different conditions of discharge current with changing magnet current has been measured from the time-of flight technique and compared with theoretical one are good matched. This IAW wave also characterized by experimentally measured basic characteristic feature of wave i.e. dispersion relation, density and potential fluctuation relation etc. [3]. Furthermore, by increasing the potential strength the wave acquires visible nonlinear characteristics, displaying the resulting coherence. This nonlinear wave has also been characterized by experimentally measured basic characteristic feature of the wave and this experimentally measured wave properties are compared with 1-D KdV ion acoustic soliton. The properties of small amplitude ion acoustic waves (IAW) and its Soliton excited in MPD with changing equilibrium plasma properties bring some interesting observation and that will be discussed.

Reference:
1. A. D. Patel, M. Sharma, N. Ramasubramanian, J. Ghosh, P. K. Chattopadhyay, Phys. Scr. 95, 035602 (2020).
2. M. Sharma, A. D. Patel, N. Ramasubramanian, R. Ganesh, P. K. Chattopadhyay, and Y. C. Saxena, Plasma Res. Express 2, 045001 (2020).
3. M. Sharma, A. D. Patel, N. Ramasubramanian, R. Ganesh, P. K. Chattopadhyay, and Y. C. Saxena, Phys. Plasmas 27, 022120 (2020).