

Seminar

Institute for Plasma Research

Title : Study of Plasma Turbulence in Large Volume Plasma Device (LVPD)

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Date : 29th January 2018 (Monday)

Time : 03.30 PM

Venue : Seminar Hall, IPR

Abstract :

Study of plasma turbulence remains an issue of concern for fusion and astrophysical plasmas because of its significance towards plasma transport. In pursuance of carrying out investigations on plasma turbulence, Large Volume Plasma Device (LVPD) has demonstrated successful excitation of Electron Temperature Gradient (ETG) driven plasma turbulence [1]. The ETG suitable plasma was made possible, primarily because of the presence of large Electron Energy Filter (EEF). The EEF divides LVPD plasma into three distinct plasma regions namely, 1) Source, 2) EEF and 3) Target plasmas, offering strikingly different turbulence characteristics. The present thesis will focus primarily on experimental investigations carried out in the three plasma regions. The source plasma identifies excited turbulence as Quasi-Longitudinal (QL) Whistlers excited by the reflected energetic electrons emanating from the loss-cone. The EEF plasma describes how plasma of source region responds to EEF. Results on plasma transport across the EEF and excitation of Rayleigh-Taylor instability due to the axial density gradient and curvature in magnetic field will be discussed and lastly, turbulence characteristics of diffused plasma across EEF in near EEF target region will be described. The presentation will also highlight results on novel Center Tapped Emissive Probe (CTEP), developed for carrying out plasma potential measurements.

References:

1. "Experimental Observation of Electron-Temperature-Gradient Turbulence in a Laboratory Plasma", S. K. Mattoo, S. K. Singh, L. M. Awasthi, R. Singh, and P. K. Kaw, Physical Review Letters 108, 255007(2012).
 2. "Plasma response to electron energy filter in large volume plasma device" A. K. Sanyasi, L. M. Awasthi, S. K. Mattoo, P. K. Srivastava, S. K. Singh, R. Singh and P. K. Kaw, Phys. Plasmas 20,122113 (2013).
 3. "Observation of reflected electrons driven quasi-longitudinal (QL) whistlers in large laboratory plasma" A. K. Sanyasi, L. M. Awasthi, P. K. Srivastava, S. K. Mattoo, D. Sharma, R. Singh, R. Paikaray, P. K. Kaw, Phys. Plasmas 24, 102118 (2017).
 4. "Plasma potential measurement using centre tapped emissive probe (CTEP) in laboratory plasma" A. K. Sanyasi, P. K. Srivastava, and L. M. Awasthi, Meas. Sci. technol. 28 (2017).
 5. "Performance of large electron energy filter in large volume plasma device" S. K. Singh, P. K. Srivastava, L. M. Awasthi, S. K. Mattoo, A. K. Sanyasi, R. Singh, and P. K. Kaw, Rev. Sci. Instrum. 85, 033507 (2014).
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