Seminar

Institute for Plasma Research

Title : Development of high power Helicon Plasma Thruster (HPT) and up-gradation of Helicon eXperimental (HeX) device

Speaker : Dr. Sonu Yadav
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Date : 11th May 2021 (Tuesday)

Time : 11:00 AM

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

Abstract:

The helicon source is known to provide a highly efficient plasma source with exceptionally high density at modest input RF power compared to conventional inductive or capacitive discharge. When the helicon source uses with a diverging magnetic nozzle, it is capable of producing plasma flow, which has the potential application for electrical propulsion system. In this type of system, the plasma produced inside the narrow source chamber is transported along the magnetic field lines and expands in the magnetic nozzle. Here plasma is spontaneously accelerated into the axial direction along the magnetic nozzle, yielding a generation of the plasma thrust. Based on above notion, devotement of high power (5 kW) helicon plasma thruster (HPT) system is on progress. After shifting to new lab building of IPR last year, significant progress has been made in terms of re-establishment of helicon plasma operation in both HPT and HeX device. HeX is a device which previously used to understand the fundamentals behind the high efficiency of helicon plasma and magnetic nozzle acceleration. In HPT system efforts are being made to achieve stable 1-5 kW helicon plasma using 5kW RF power supply. Though, blue core argon helicon plasma has been achieved in the source tube but diagnostics are yet to be implemented. Apart from this, in HeX setup the major up-gradation has been made by invoking the variable frequency (3-30 MHz) RF power supply, and quart plasma source tube. However, redesigning of electromagnet system is under progress to achieve continues operation of magnetic field upto 2 kG. Moreover, development of Laser induced fluorescence (LIF) diagnostics is on progress which would be used for study of argon ion dynamics.