

# Seminar

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## Institute for Plasma Research

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**Title :** Development of Mach probe for ion flow measurement in the helicon Plasma system  
**Speaker :** Dr. Mariammal Megalingam  
Institute for Plasma Research, Gandhinagar  
**Date :** 30<sup>th</sup> August 2022 (Tuesday)  
**Time :** 3:30 PM  
**Venue :** Online- Join the talk:

[https://lobby.ipr.res.in/MariammalMegalingam\\_PDFextension](https://lobby.ipr.res.in/MariammalMegalingam_PDFextension)

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### **Abstract:**

The study of plasma flows has multiple purposes; It is observed that plasmas in space, and in the ionosphere, tend to have flows, to better understand these, it is chosen to perform experiments in the laboratory. Being able to change and control the flow, and flow shear in plasma is an important region of experimental study. In order to characterize the plasma flow velocity, two types of Mach probes viz., up-down and para-perp Mach probes have been employed to measure the axial flow in the helicon plasma system. This experiment has performed in helicon plasma thruster set-up for different RF power and magnetic field. Its corresponding Mach numbers and Plasma flow velocity has been calculated and results will be presented. To characterize basic plasma parameters in presence of flow, Langmuir probe has been designed and fabricated. For the measurements of Reynolds stress, we have designed and fabricated a forked Langmuir probe and to be installed in IMPED system for measuring the poloidal and radial electric field fluctuations and can acquire radial and poloidal velocities respectively.

To study the complex non-linear phenomena in plasma, few experiments have performed in the glow discharge system. The plasma floating potential fluctuations are observed with increasing discharge current. The results from the analysis of time series, the power spectrum, phase space trajectories confirm the existence of order - period doubling - period tripling - chaos. Further it has also been verified by the qualitative and quantitative analysis by Recurrence plot and Recurrence quantification variables. The details of the work done and future work will be discussed.

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