# Seminar

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## Institute for Plasma Research

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**Title:** Plasma characteristics in partially ionised and magnetised plasma discharge in Double Plasma Device (DPD)

**Speaker:** Dr. Jayanta Dutta
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**Date:** 16th October 2025 (Thursday)

**Time:** 10.30 AM

**Venue:** Seminar Hall, IPR

## Abstract

The initial phase of my project involved familiarizing myself with basic experimental tools of the Double Plasma Device (DPD) that consists of the Source and Target chambers, separated by a Perspex insulator, the vacuum pumping system and accessories and Langmuir probes. The plasma system pressure is pumped down to approximately $10^{-6}$ mbar using a combination of a rotary pump and a diffusion pump. The experiments are initiated, by filling the system with argon gas to a working pressure of about $10^{-4}$ mbar. In the Source chamber, a multi-filamentary cathode composed of eight V-shaped tungsten wires is used as an electron emitter. The emitted electrons further collide with the Argon molecules and produce plasma by impact ionization. A discharge voltage of approximately -70 V is applied between the anode and cathode to initiate the plasma in the DPD. The primary goal is to study basic plasma characteristics in a weakly ionized and magnetized plasma discharge, using a Langmuir probe placed at the source and target chambers. Following the earlier work by Alex et al.,2019, we aim to investigate how the radial electron temperature profile can be controlled by biasing a co-centric grid assembly (that is positioned in between the two chambers). Additionally, I have been involved in a couple of ongoing astrophysics related work, especially numerical modelling of the dynamics of accreting protostar.

**Keywords:** Double Plasma Device, weakly ionised plasma, Langmuir probe, magnetic confinement, plasma diagnostics, photoionisation, protostar accretion, radiative feedback.