Contribution ID: **49** Type: **Poster**

Non-Invasive Plasma Density Measurement in a 13.56 MHz Magnetized Capacitive Coupled RF discharge

Friday, 26 October 2018 08:30 (4 hours)

Capacitive coupled plasmas (CCP) have unique applications in microelectronic industries, besides they are also important in plasma interaction with material surfaces, such as near field region of ICRF antenna infusion devices. Systematic studies of these plasmas are concurrently carried in laboratory plasma devices to develop models to explain the anomalous behavior of plasma sheath interactions. Plasma diagnostics plays a crucial role in providing necessary input data for the verification of these models. Recently a capacitive coupled discharge with externally imposed transverse magnetic field has been developed [1]. It has been found that the external magnetic field greatly modifies the discharge characteristics, by introducing ExB drifts adjacent to the discharge plates.
Direct measurement of plasma parameters in CCP discharge is primarily difficult due to very large amplitude oscillation in plasma potential. To certain extent, a triple probe is convenient as it is routinely used in the strongly magnetized edge plasma region in tokamaks. However its application in radio-frequency plasmas needs careful design of electrical feed-through and measurement of voltage/ currents using external circuits. An alternative method to determine the average density of the plasma can be achieved by looking at the impedance characteristics of the discharge. The discharge impedance is the measure for the plasma conductivity, which intern determines the plasma density. Recently electrical circuit analysis has been applied to estimate the collisionality in magnetized CCP discharge. In this paper, we show that the plasma density can also be determined using this technique. The obtained results have been compared with a triple Langmuir probe and the results are shown to be in good qualitative agreement.

Country or International Organization

India

Paper Number

FIP/P7-36

Primary author: Ms BINWAL, shikha (Jamia Millia Islamia (A Central University))

Co-authors: Mr JOSHI, Jay (Institute for Plasma Research); Prof. NAIR, Lekha (Jamia Millia Islamia (A Central University)); Dr KARKARI, Shantanu (Institute for Plasma Research)

Presenter: Ms BINWAL, shikha (Jamia Millia Islamia (A Central University))

Session Classification: P7 Posters

Track Classification: FIP - Fusion Engineering, Integration and Power Plant Design