

Experimental investigation of Power Coupling by RF Antenna into Plasmas in Presence of Magnetized Ions

Wednesday 24 October 2018 14:00 (20 minutes)

Capacitive discharges are created in the near field regions of ICRF antennas and thus power coupling by these antennas depend on the sheaths around them. Magnetization of ions in the plasma around these antennas also affects the power coupling into the plasma with major implications in ICRF antenna's in tokomaks.

A capacitive discharge is designed to study power coupling in such plasmas in a linear device. A symmetric capacitively coupled helium discharge is created by three cylindrical electrodes placed at specific axial positions in a linear chamber in presence of axial magnetic fields. Axial magnetic field is strong enough to magnetize helium ions with their cyclotron radius smaller than, the cylindrical electrode radius.

In this study, power measurement in conjunction with detail circuit analysis of magnetized capacitive sheaths has been performed to determine the plasma impedance. Plasma impedance can reveal many important aspects of the power coupling into the plasma such as the mode of discharge, power coupling to individual species (ions and electrons) and conditions of electron series resonance all of which are modified extensively in presence of magnetic field. The obtained impedance characteristics along with power measurements are qualitatively discussed to understand the effect of magnetization of ions on the discharge.

Country or International Organization

India

Paper Number

EX/P4-20

Author: Mr JOSHI, Jay (Institute for Plasma Research, India)

Co-authors: Dr KARKARI, Shantanu (Institute for Plasma Research,INDIA); Mr KUMAR, Sunil (Institute for Plasma Research)

Presenter: Mr JOSHI, Jay (Institute for Plasma Research, India)

Session Classification: P4 Posters