Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

A Parametric Study using Fluid and Particle-in-Cell Modeling of the Ion Distributions in RF sheaths at ICRH antennas MOUTAZ ELIAS, DAVIDE CURRELI, University of Illinois at Urbana-Champaign, JAMES MYRA, Lodestar — RF sheaths have been a major concern accompanying the use of ICRH systems. The presence of RF sheaths has been linked to the enhancement of the impurity flux sputtered from the Plasma Facing Components. It is a pivotal task to minimize the impurity emission from the PFC of the ICRH system. Previous attempts to model RF sheaths and PMI are limited to fluid description of the plasma. In this work, we used multi-model approach, using (1) a fluid model of the RF sheath, and (2) a hybrid PIC model (hPIC) to analyze the dependence of the kinetic IEAD impacting the RF antenna on the various RF sheath parameters. We highlighted the dependence of the IEAD on the RF frequency and the magnetic field angle. We also compared the IEAD from the field aligned and poloidal aligned RF antenna configurations. Furthermore, a simulation case representing the latest JET campaign was analyzed. We found that the IEAD for JET campaign case contains a cusp resulting from the kinetic motion of the ions.

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Date submitted: 02 Jul 2020 Electronic form version 1.4