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Modeling wall ion fluxes in an RF discharge: insights from 2D PIC simulation ROMAIN LUCKEN, Laboratoire de Physique des Plasmas, UMR CNRS/Ecole polytechnique, TREVOR LAFLEUR, Laboratoire de Physique des Plasmas, UMR CNRS/Ecole polytechnique, Centre National dtudes Spatiales (CNES) Toulouse, VIVIEN CROES, ANTOINE TAVANT, Laboratoire de Physique des Plasmas, UMR CNRS/Ecole polytechnique, Safran Aircraft Engines, Electric Propulsion Unit, ANNE BOURDON, PASCAL CHABERT, Laboratoire de Physique des Plasmas, UMR CNRS/Ecole polytechnique — Global models of plasma discharges have been widely used to simulate plasma reactors in the fields of plasma processing and space propulsion [Chabert et al 2012, Grondein et al. 2016]. These models rely on accurate description of the ion current leaving the plasma: after undergoing a pre-sheath drop, the ions enter the sheath at Bohm velocity. The pre-sheath drop is characterized by an edge-to-center plasma density ratio h_L and heuristic models were formerly derived to understand how this parameter varies with plasma temperatures and ion mean free path, based on one-dimensional (1D) transport theory [Chabert et al. 2011], and validated by 1D simulation [Lafleur et al. 2015]. A model of inductively coupled plasma (ICP) discharges was implemented into a 2D benchmarked particle-in-cell (PIC) code [Turner et al. 2012], running with various gases (Ar, He, Xe). These simulations show that the ion flux has a strong spatial dependency – in agreement with former results [Lafleur et al. 2012] – and that it is affected by the aspect ratio of the discharge reactor. The influence of dielectric walls is also investigated.

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