

Abstract Submitted
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3D-PIC simulation of an inductively coupled ion source¹ ROBERT HENRICH, NINA SARAH MUEHLICH, MICHAEL BECKER, CHRISTIAN HEILIGER, Justus-Liebig-University Giessen, Institut fuer Theoretische Physik — Inductively coupled ion sources are applied to a wide range of plasma applications, especially surface modifications. The knowledge of the behavior and precise information of the plasma parameters are of main importance. These values are tedious to measure without influencing the discharge. By applying our fully three-dimensional PlasmaPIC tool we are able to reach these plasma parameters with a spatial and temporal resolution which is quite hard to achieve experimentally. PlasmaPIC is used for modeling discharges in arbitrary geometries without limitations to any symmetry. By this means we are able to demonstrate that the plasma density has an irrotational character. Furthermore, we will show the dependence of the plasma parameters of different working conditions. We will show that for gridded inductively coupled ion sources the neutral gas pressure inside the discharge chamber depends on the extraction of ions. This effect is considered in PlasmaPIC by a self-consistent coupling of the neutral gas simulation and the plasma simulation whereas the neutral gas distribution is calculated using the direct simulation Monte Carlo method (DSMC).

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