Analysis of the impact of antenna and plasma models on RF potentials evaluation

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The design of an Ion Cyclotron (IC) launcher is essentially driven by its coupling properties and its capability of maintaining low parallel electric fields in front of it, indeed providing good power transfer to plasma and avoiding unwanted phenomena such as sheath rectification or hot spots. Both aspects are deeply related to the adopted geometry and the loaded plasma model; the systematic usage of TOPICA code [1], able to precisely take into account a realistic antenna geometry and an accurate plasma description, could certainly help in understanding which elements may have a not negligible effect on the antenna design.
This paper presents a detailed comparison, carried out with TOPICA code, between a simplified flat version of one of the IC antennas installed in ASDEX Upgrade experiment and its real curved geometry. The advantages and disadvantages of both geometrical representations are outlined in terms of power transferred to the plasma and with a specific focus on sheath driving potentials. To complete the overview, the importance of an accurate plasma description is also exploited.

[1] D. Milanesio et al., Nucl. Fusion **49**, 115019 (2009).