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A Predictive Simulation Tool for Plasma Facing Antennas R. MAGGIORA, V. LANCELLOTTI, D. MILANESIO, V. KYRYTSYA, L. VALI-TUTTI, G. VECCHI, Dipartimento di Elettronica, Politecnico di Torino, 10129 Torino, Italy, A. PARISOT, S.J. WUKITCH, Plasma Science and Fusion Center, M.I.T., Cambridge, MA 02139 USA — TOPICA is an innovative tool for the simulation of plasma facing antennas that incorporates commercial-grade 3D graphic interfaces and an accurate description of the plasma. The coaxial feeding line or waveguide are modeled as such; computation and visualization of relevant parameters (input scattering parameters, current and field distributions, etc.) complete the suite. The approach to the problem is based on an integral-equation formulation for the self-consistent evaluation of the current distribution on the conductors. The environment has been subdivided in two coupled region: the plasma region and the vacuum region. The two problems are linked self-consistently by representing the field continuity in terms of equivalent (unknown) sources. In the vacuum region all the calculations are executed in the spatial domain, and this allows triangularfacet description of the arbitrarily shaped conductors and associated currents; in the plasma region a spectral representation of the fields is used, which allows to enter the plasma effect via impedance matrix. This work is devoted to an extensive set of comparisons between system parameters measured during operation and simulated. The comparison demonstrates a very good agreement, leading to a validation of TOPICA as a reliable predictive tool.

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