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TOPICA/TORIC integration for self-consistent antenna and plasma analysis RICCARDO MAGGIORA, VITO LANCELLOTTI, DANIELE MILANESIO, VOLODYMYR KYRYTSYA, GIUSEPPE VECCHI, Politecnico di Torino, Italy, PAUL T. BONOLI, JOHN C. WRIGHT, MIT, Cambridge MA, USA — TOPICA [1] is a numerical suite conceived for prediction and analysis of plasma-facing antennas. It can handle real-life 3D antenna geometries (with housing, Faraday screen, etc.) as well as a realistic plasma model, including measured density and temperature profiles. TORIC [2] solves the finite Larmor radius wave equations in the ICRF regime in arbitrary axisymmetric toroidal plasmas. Due to the approach followed in developing TOPICA (i.e. the formal splitting of the problem in the vacuum region around the antenna and the plasma region inside the toroidal chamber), the code lends itself to handle toroidal plasmas, provided TORIC is run independently to yield the plasma surface admittance tensors$\underline{\underline{\tilde{Y}}}(m, m', n_\varphi)$. The latter enter directly into the integral equations solved by TOPICA, thus allowing a far more accurate plasma description that accounts for curvature effects. TOPICA outputs comprise, among others, the EM fields in front of the plasma: these can in turn be input to TORIC, in order to self-consistently determine the EM field propagation in the plasma. In this work, we report on the theory underlying the TOPICA/TORIC integration and the ongoing evolution of the two codes.
[1] V. Lancellotti et al., Nucl. Fusion, **46** (2006) S476
[2] M. Brambilla, Plasma Phys. Contr. Fusion (1999) **41** 1

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