

Benchmark simulations of ICRF antenna coupling

F. Louche, P.U. Lamalle, A.M. Messiaen and
B. Van Compernelle¹, D. Milanesio and R. Maggiora²

¹*Plasma Physics Laboratory, Association EURATOM - Belgian State, Partner in TEC, Royal Military Academy, Brussels, Belgium*

²*Politecnico di Torino, Torino, Italy*

Although the recent years have seen considerable advances in the modelling tools available for the design of ICRF antennas, estimating the loading of future systems and the associated maximum coupled power remain challenging problems. Commercial 3-D electromagnetic softwares based on time- or frequency-domain methods can nowadays simulate complex wave launcher geometries in affordable time. Unfortunately they still cannot model magnetized plasmas in the IC frequency range and require approximating the latter by non-gyrotropic dielectrics. The validity of such approximations has been discussed in [1, 2]. The TOPICA code [3] handles realistic antenna geometries and magnetized plasmas, but is as a result generally more computer intensive. The paper reports on benchmark simulations of antenna input impedance parameters with CST Microwave Studio [4], TOPICA and ANTITER 2, a slab coupling code applicable to recessed antennas such as the ITER one. The goal of this activity is to further assess the degree of agreement between three different approaches, as a good agreement (or well-understood differences) would accrue confidence in the loading predictions.

[1] P. U. Lamalle *et al.*, Nucl. Fusion **46** (4), 432-443, 2006

[2] A. M. Messiaen *et al.*, LPP ERM/KMS Report 123, May 2004

[3] R. Maggiora *et al.*, Nucl. Fusion **44**, 846-868, 2004

[4] CST Microwave Studio User Manual, Version 6.0, CST GmbH, Darmstadt, Germany 2006