The ITER ICRF Antenna Design with TOPICA DANIELE MI-
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CHI, Politecnico di Torino — TOPICA (Torino Polytechnic Ion Cyclotron Antenna)
code is an innovative tool for the 3D/1D simulation of Ion Cyclotron Radio Fre-
quency (ICRF), i.e. accounting for antennas in a realistic 3D geometry and with an
accurate 1D plasma model [1]. The TOPICA code has been deeply parallelized and
has been already proved to be a reliable tool for antennas design and performance
prediction. A detailed analysis of the 24 straps ITER ICRF antenna geometry
has been carried out, underlining the strong dependence and asymmetries of the
antenna input parameters due to the ITER plasma response. We optimized the
antenna array geometry dimensions to maximize loading, lower mutual couplings
and mitigate sheath effects. The calculated antenna input impedance matrices are
TOPICA results of a paramount importance for the tuning and matching system
design. Electric field distributions have been also calculated and they are used as
the main input for the power flux estimation tool. The designed optimized antenna
is capable of coupling 20 MW of power to plasma in the $40 - 55$ MHz frequency
range with a maximum voltage of 45 kV in the feeding coaxial cables.

[1] V. Lancellotti et al., Nuclear Fusion, **46** (2006) S476-S499

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