Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

RF potentials analysis using TOPICA DANIELE MILANESIO, MARCO SORBA, RICCARDO MAGGIORA, Politecnico di Torino — Radio-frequency (RF) heating is fully dependent on edge plasma conditions and particularly on the acceleration of charged particles which can damage the antennas and surroundings. Rectified RF field induces drifts on ions that can hit the first wall, causing hot spots, sputtering, impurities, fuel dilution and, eventually, disruption. These phenomena mainly depend on the antenna geometry and materials, on the plasma density profile at the edge and on the connection patterns. The heat flux attributed to accelerated ions is somehow proportional to the RF potential in front of the antenna. Because of this, the understanding of the RF potential generation in front of the antenna is crucial for every high RF power systems, in order to predict the deleterious particle flux and therefore mitigate its effect by means of a proper design. The TOPICA code, an innovative tool realized for the analysis and design of ICRH and LH antennas, has been upgraded to evaluate the RF potential in front of the antenna. The solution of the Maxwell's equations in plasma combined with the RF field map at the plasma edge (standard outputs of TOPICA calculation) allow for the computation of the RF fields also in the plasma region. A new TOPICA module has been developed to account for a rigorous procedure to obtain the RF potentials and RF potential mitigation techniques through antenna geometrical modifications have been studied and will be presented.

Giuseppe Vecchi
Politecnico di Torino

Date submitted: 18 Jul 2008 Electronic form version 1.4