Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Plasma–Surface Interactions and RF Antennas[1] THOMAS JENKINS, D.N. SMITHE, K. BECKWITH, B.D. DAVIDSON, S.E. KRUGER, A.Y. PANKIN, C.M. ROARK, Tech-X Corporation — Implementation of recently developed finite-difference time-domain (FDTD) modeling techniques on high-performance computing platforms allows RF power flow, and antenna near- and far-field behavior, to be studied in realistic experimental ion-cyclotron resonance heating scenarios at previously inaccessible levels of resolution. We present results and 3D animations of high-performance (10k–100k core) FDTD simulations of Alcator C-Mod's field-aligned ICRF antenna on the Titan supercomputer, considering (a) the physics of slow wave excitation in the immediate vicinity of the antenna hardware and in the scrape-off layer for various edge densities, and (b) sputtering and impurity production, as driven by self-consistent sheath potentials at antenna surfaces. Related research efforts in low-temperature plasma modeling, including the use of proper orthogonal decomposition methods for PIC/fluid modeling and the development of plasma chemistry tools (e.g. a robust and flexible reaction database, principal path reduction analysis capabilities, and improved visualization options), will also be summarized.

[1]Supported by U.S. DoE SBIR Phase I/II Award DE-SC0009501 and ALCC/OLCF.

Thomas Jenkins
Tech-X Corporation

Date submitted: 24 Jul 2015 Electronic form version 1.4