

Abstract Submitted  
for the DPP08 Meeting of  
The American Physical Society

**Time-Domain Simulation of Edge Plasma, Sheaths, and RF Couplers, on NERSC Supercomputers**<sup>1</sup> D.N. SMITHE, Tech-X Corporation, D.A. D'IPPOLITO, J.R. MYRA, Lodestar Research Corporation, J.A. CARLSSON, Tech-X Corporation — We report on the installation of the “Time-Domain Plasma with Sheath Boundaries” simulation software [2] on NERSC computers. We present studies of parallel processing performance, efficiency, and scaling characteristics. The overall iterative cycle of the calculation resembles a typical FDTD Maxwell solver, but is instead dominated by additional fields and computations associated with the local time-domain plasma calculation, hence resulting in a different trade-off in terms of memory bandwidth and communication limitations. We also present final details of the FD sheath algorithm, designed to accurately implement the sheath boundary model [3] in a Yee-cell finite-difference cut-cell geometry, and verification of the algorithm for standard cases involving slow and fast waves. Issues associated with importation and construction of accurate 3-D edge and coupler geometries from drawings and documentation for fusion experiments such as MST, D-IIID, C-Mod, NSTX, and ITER will also be discussed. [2] David N. Smithe, Phys. Plasmas 14,056104 (2007); DOI:10.1063/1.2710784. [3] D.A. D'Ippolito and J.R. Myra, Phys. Plasmas 13, 102508 (2006).

<sup>1</sup>Work supported by US DOE grant DE-FC02-08ER54953, the Center for Simulation of Wave Plasma Interactions.

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Date submitted: 22 Jul 2008

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