Time-Domain Simulation of RF Couplers on NERSC Supercomputers[1] DAVID SMITHE, JOHAN CARLSSON, Tech-X Corporation, TRAVIS AUSTIN — We report on progress in simulating the behavior of RF couplers in tokamak devices with the "Time-Domain Plasma with Sheath Boundaries" simulation software [1]. Recent work focuses on the challenges of up-scaling to more complicated coupler geometry, running on NERSC supercomputers, and improvements for full implicitness in the sheath model. Previously we have used CAD drawings and parametric models to simulation a LH coupler on the MST tokamak, and now are constructing edge geometry for NSTX and C-Mod ICRF couplers. Issues associated with importation and construction of accurate 3-D edge and coupler geometries from drawings and documentation will be explored. We will also discuss results from 1-D benchmark exercises of the sheath model [2], and possible techniques for extension of the model to include long-range effects. Finally, we consider the feasibility of other possible improvements to the overall model, including the use of test-particles to show non-linear effects, and an analysis aimed at the possible inclusion of thermal effects in the time-domain plasma algorithm. [1] David N. Smithe, Phys. Plasmas 14, 056104 (2007); DOI:10.1063/1.2710784. [2] D.A. D'Ippolito and J.R. Myra, Phys. Plasmas 13, 102508 (2006).

David Smithe
Tech-X Corporation

Date submitted: 13 Jan 2009

Electronic form version 1.4