

Abstract Submitted
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Recent Results from the SciDAC Center for Simulation of Fusion Relevant RF Actuators¹ P. T. BONOLI, MIT, D. L. GREEN, E. D'AZEVEDO, ORNL, N. BERTELLI, PPPL, A. DIMITS, T. KOLEV, LLNL, D. N. SMITHE, Tech-X Corp, R. W. HARVEY, CompX, J. R. MYRA, Lodestar Research, M. S. SHEPHARD, RPI, D. CURRELI, University of Illinois - UC, RF SCIDAC-4 TEAM — An overview is given of recent research results related to the self-consistent interaction of RF power with the scrape-off layer (SOL). We will discuss the development and application of RF wave solvers based on the open-source scalable Modular Finite Element Framework (MFEM), including the implementation of a RF sheath boundary, work on pre-conditioners for matrix solves, and grid adaptivity. We will discuss the development of a far-SOL fluid transport solver for equilibrium (Braginskii MFEM mini-app) and turbulent (SOLT-3D code based on BOUT++) models. The turbulent transport model includes the presence of a RF ponderomotive force term which can be calculated directly from the results of the VSim FDTD plasma wave code. Results from full-wave RF solvers utilizing SOL turbulence data from an edge turbulence code will also be presented. Results in plasma-material-interactions will be presented on benchmarking of kinetic vs fluid sheath models, parameterization of a sub-grid RF sheath model, results from a 1D RF sputtering model, and results for fast ion impact at the plasma wall from an RF Monte Carlo code.

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