Recent Results from the SciDAC Partnership for Simulation of Fusion Relevant RF Actuators[1] P. T. BONOLI, MIT-PSFC, D. L. GREEN, E. D'AZEVEDO, ORNL, N. BERTELLI, PPPL, A. DIMITS, T. KOLEV, LLNL, D. N. SMITHE, Tech-X, R. W. HARVEY, CompX, J. R. MYRA, Lodestar Research, M. S. SHEPHARD, RPI, D. CURRELI, University of Illinois - UC, RF SCIDAC PARTNERSHIP COLLABORATION — We present an overview of research related to the interaction of ICRF and LHRF power with the tokamak scrape-off layer (SOL) and core. We discuss the development and application of the RF full-wave solver Stix and the more general FEM analysis platform Petra-M, both based on the Modular Finite Element Framework (MFEM), highlighting work on matrix pre-conditioners, implementation of high fidelity geometric descriptions of ICRF antennas, and incorporation of a RF sheath boundary. We will discuss the development of a far-SOL fluid transport solver for equilibrium (Braginskii MFEM mini-app) and a turbulent (SOLT-3D code based on BOUT++) model, including a RF ponderomotive force term, which can be calculated directly from the VSim FDTD plasma wave code. Results for the interaction of RF power with metallic surfaces will be presented, including PIC simulations of the ion energy-angle distributions at ICRH antennas in RF sheaths. We will also discuss novel applications of LHRF power for mitigating disruptions, extension of RF codes to mirror geometries, and implementation of RF codes on GPU's.

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