

Abstract Submitted  
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**Modeling of complex geometries with the plasma simulation code VORPAL** CHET NIETER, JOHN R. CARY<sup>1</sup>, PETER MESSMER, DAVID BRUHWILER, DAVID SMITHE, Tech-X Corporation, GREGORY R. WERNER, University of Colorado — Modeling complex structures and boundaries on a Cartesian grid is a challenge for many Finite Difference Time Domain (FDTD) electromagnetic PIC codes. The simulation of a variety of devices such as accelerating cavities, plasma processing chambers, and antennas at the edge of tokamaks require conformal (curve fitting) boundaries. Since these devices are fundamentally three dimensional, the capability to run in parallel on large numbers of processors is needed. We have recently added conformal boundaries using the method of Zagorodnov to the plasma simulation code VORPAL. Our boundary approximation can be viewed with a 3D VRML viewer. Also these complex devices often include open boundaries. VORPAL includes Perfectly Matched Layer (PML) boundaries which efficiently absorb out-going waves of any frequency and angle of incidence. VORPAL's FDTD algorithms scale to thousands of processors allowing for large 3D simulations. Simulations of complex structures using VORPAL will be presented.

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