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Comparison of a 3-D GPU-Assisted Maxwell Code and Ray Tracing for Reflectometry on ITER[1] SARAH GADY, Whitworth University, SHIGEYUKI KUBOTA, UCLA, IRENA JOHNSON, PPPL — Electromagnetic wave propagation and scattering in magnetized plasmas are important diagnostics for high temperature plasmas. 1-D and 2-D full-wave codes are standard tools for measurements of the electron density profile and fluctuations; however, ray tracing results have shown that beam propagation in tokamak plasmas is inherently a 3-D problem. The GPU-Assisted Maxwell Code utilizes the FDTD (Finite-Difference Time-Domain) method for solving the Maxwell equations with the cold plasma approximation in a 3-D geometry. Parallel processing with GPGPU (General-Purpose computing on Graphics Processing Units) is used to accelerate the computation. Previously, we reported on initial comparisons of the code results to 1-D numerical and analytical solutions, where the size of the computational grid was limited by the on-board memory of the GPU. In the current study, this limitation is overcome by using domain decomposition and an additional GPU. As a practical application, this code is used to study the current design of the ITER Low Field Side Reflectometer (LSFR) for the Equatorial Port Plug 11 (EPP11). A detailed examination of Gaussian beam propagation in the ITER edge plasma will be presented, as well as comparisons with ray tracing.

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