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Full-wave Simulation of High Field Side Scrape Off Layer Reflectometry and Lower Hybrid Coupling on DIII-D[1] EVAN LEPPINK, Massachusetts Institute of Technology MIT, CORNWALL LAU, Oak Ridge National Laboratory, STEPHEN WUKITCH, Massachusetts Institute of Technology MIT —
The scrape off layer (SOL) density profile plays an important role in the coupling of lower hybrid waves into the core plasma for non-inductive current drive in tokamaks. When studying this wave coupling, it is crucial that the SOL density profile is accurately measured in experiments and proper numerical techniques are used in simulation. For the upcoming high field side (HFS) LHCD experiment on DIII-D, a compact reflectometer has been designed to measure the SOL density profile near the launcher with high temporal and spatial resolution. The final reflectometer design is presented here, including full-wave simulation of the reflectometry measurement using COMSOL. For the simulation of the LH-SOL interaction, full-wave simulations are required as ray-tracing assumptions are no longer valid in the SOL due to the proximity to the cutoff layer and the small length scales of the density profile in the SOL relative to the lower hybrid wavelength. To study the SOL's effect on LH coupling, the full-wave code PETRA-M is used to simulate the DIII-D HFS lower hybrid launcher and the SOL. This is coupled to the ray-tracing package GENRAY/CQL3D for simulation of core physics. Preliminary results of this simulation work and its insight for upcoming experimental runs on DIII-D is presented.

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Evan Leppink
Massachusetts Institute of Technology MIT

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