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Optimizing Antenna Layout for ITER Low Field Side Reflectometer using 3D Ray Tracing Code SARAH NEWBURY, Harvard University, ALI ZOLFAGHARI, Princeton Plasma Physics Laboratory — The ITER Low Field Side Reflectometer (LFSR) is being designed to provide electron density profile measurements for both the core and edge plasma through the launching of millimeter waves into the plasma and the detection of the signal of the reflected wave by a receive antenna. Because the detection of the received signal is integral to the determination of the density profile, an important goal in designing the LFSR is to optimize the coupling between launch and receive antennas. This project investigates this subject by using Genray, a 3D ray tracing code, to simulate the propagation of millimeter waves launched into and reflected by the plasma for a typical ITER case. Based upon the results of the code, beam footprints will be estimated for different cases in which both the height and toroidal angle of the launch antenna are varied. The footprints will be compared, allowing conclusions to be drawn about the optimal antenna layout for the LFSR. This method will be carried out for various frequencies of both O-mode and X-mode waves, and the effect of the scrape-off layer of the plasma will also be considered.

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