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Full-wave Modeling of EBWs in Pegasus SARA GALLIAN, MICHAEL BONGARD, FRANCESCO VOLPE, UW Madison, JONATHAN JACQUOT, ALF KÖHN, IPF Stuttgart — We model the injection of ordinary(O) and extraordinary(X) waves at 2.45GHz, their conversion in Electron Bernstein Waves(EBWs) and the initial propagation of EBWs in the Pegasus spherical torus, by means of the recently improved IPF-FDMC finite-difference-time-domain Maxwell-fluid solver. Simulations are performed in 2D in cylindrical and Cartesian coordinates, in a poloidal, horizontal or "oblique" cut (at the magnetic pitch inclination, where the OXB conversion is most efficient). The OXB and XB conversion efficiencies are evaluated for various antenna designs and launch geometries. Reflections from the wall and collisions at the upper hybrid are included. The motivation for the full-wave approach is that the O and X vacuum wavelength (12cm) is comparable with the plasma radius(30-45cm). EBWs, however, develop a short wavelength fulfilling the ray tracing approximation. For this reason, EBW wavefronts are separated from the long-wavelength O and X-mode by means of high-pass spatial filtering of the full-wave results. Then, local wave-vectors are defined, that might serve as initial conditions for future ray tracings including absorption.

Sara Gallian
UW Madison

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