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Development of Impedance Sheath Boundary Conditions in Stix Finite Element RF Code CHRISTINA MIGLIORE, JOHN WRIGHT, Massachusetts Institute of Technology MIT, MARK STOWELL, Lawrence Livermore National Laboratory, PAUL BONOLI, Massachusetts Institute of Technology MIT — Ion cyclotron radio frequency range (ICRF) power plays an important role in heating and current drive in fusion devices. However, experiments show that in the ICRF regime there is a formation of a radio frequency (RF) sheath at the material and antenna boundaries that influences sputtering and power dissipation. Given the size of the sheath relative to the scale of the device, it can be approximated as a boundary condition (BC). Electromagnetic field solvers in the ICRF regime typically treat material boundaries as perfectly conducting, thus ignoring the effect of the RF sheath. Here we describe progress on implementing a model for the RF sheath based on the a finite impedance sheath BC formulated by J. Myra 2015 ˜\footnote{J. Myra, et al., Phys. Plasmas 22, 062507 (2015)}which provides a representation of the RF rectified sheath including capacitive and resistive effects. This research will discuss the results from the development of a parallelized cold-plasma wave equation solver Stix that implements this non-linear sheath impedance BC through the method of finite elements in pseudo-1D and pseudo-2D using the MFEM library [http://mfem.org].

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