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Radio-frequency sheath boundary condition for fast wave propagation[1] D.A. D'IPPOLITO, J.R. MYRA, Lodestar Research Corp. — Analyzing the formation and consequences of rf-sheaths in ICRF-heated fusion devices is an important issue in rf physics. Quantitative calculation of the sheath properties can be included in rf codes by means of a sheath boundary condition (BC) [D. D'Ippolito et al., Phys. Plasmas 13, 102508 (2006); J.R. Myra et al., Phys. Plasmas 1, 2890 (1994).]. However, this requires resolving both the long fast wave (FW) and short slow wave (SW) space scales in the same simulation, which is computationally challenging, even on a parallel computer [H. Kohno, PhD thesis, 2011]. Here, we describe and test a modified approach which is valid when the SW is evanescent near the wall. The SW is incorporated into the sheath BC analytically, so that the simulation only has to solve the FW equations numerically with the lower resolution appropriate to the ion scale length. The derivation of the new BC will be described and its use will be illustrated in a sample problem.

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