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A numerical analysis of the RF wave propagation under the sheath boundary condition in the ion cyclotron range of frequencies<sup>1</sup> HARUHIKO KOHNO, Massachusetts Institute of Technology, J.R. MYRA, D.A. D'IPPOLITO, Lodestar — Applying radio-frequency (RF) waves to heat plasmas and drive current is an important technique for magnetic fusion, and much research effort has been spent on improving the methods, particularly in the ion cyclotron range of frequencies. In this study, a numerical analysis is carried out to observe the RF wave propagation and its interaction with the sheath in the scrape-off layer. A two-dimensional finite element code is developed to test the effect of sheaths on waves in cold plasma with the equilibrium magnetic field having a small component into the wall. Through the analysis, the short scale modes, which are localized in the vicinity of the sheath, are observed as a consequence of imposing the sheath boundary condition, and it is found that the amplitude and the wavelength of the modes depend on the sheath width. The significance of the nonlinear interaction of waves with the sheath is also investigated under various conditions.

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Haruhiko Kohno Massachusetts Institute of Technology

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