

Abstract Submitted
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Estimation of the O-X-B and X-X-B mode conversion rates with taking into account the electric field profile of the launched wave by using full wave analysis¹ HIROE IGAMI, National Institute for Fusion Science, ATSUSHI FUKUYAMA, Kyoto University, HIROSHI IDEI, Kyushu University, KAZUNOBU NAGASAKI, Kyoto University — The electron Bernstein (B) wave is excited via the mode conversion process from the slow extraordinary (SX) wave. Considering the wave launching from the low field side, mode conversions from the fast X (FX) and/or the ordinary (O) wave to the SX wave occur beyond the cutoffs before the X-B mode conversion. There are several analytic forms to calculate the O-X and/or X-X mode conversion rates considering the plane wave propagation in the slab geometry. However, in the experiments electromagnetic waves are launched by waveguide or quasi-optical antenna and cannot be assumed to be plain waves. We can calculate the electric field vector by the TASK/WF2D code that solves the Maxwell's equation by finite element method in the two-dimensional space. Plasma parameter profiles and the electric field profile at the calculation boundary can be input arbitrary. In addition to obtain a precise view of the wave propagation across the cutoffs, the O-X and/or X-X mode conversion rates can be estimated qualitatively from the Poynting fluxes of launched and transmitted/reflected waves. With introducing the kinetic full wave analysis using an integral form of dielectric tensor, the X-B mode conversion rate can be also estimated from the absorbed power of the B wave.

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