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Development of Extended Ray-tracing method including diffraction, polarization and wave decay effects KOTA YANAGIHARA, Nagoya Univ., SHIN KUBO, National Institute for Fusion Science, Nagoya Univ., ILYA DODIN, Princeton Plasma Physics Laboratory, Princeton Univ., HIROAKI NAKAMURA, National Institute for Fusion Science, Nagoya Univ., TORU TSUJIMURA, National Institute for Fusion Science — Geometrical Optics Ray-tracing is a reasonable numerical analytic approach for describing the Electron Cyclotron resonance Wave (ECW) in slowly varying spatially inhomogeneous plasma. It is well known that the result with this conventional method is adequate in most cases. However, in the case of Helical fusion plasma which has complicated magnetic structure, strong magnetic shear with a large scale length of density can cause a mode coupling of waves outside the last closed flux surface, and complicated absorption structure requires a strong focused wave for ECH. Since conventional Ray Equations to describe ECW do not have any terms to describe the diffraction, polarization and wave decay effects, we can not describe accurately a mode coupling of waves, strong focus waves, behavior of waves in inhomogeneous absorption region and so on. For fundamental solution of these problems, we consider the extension of the Ray-tracing method. Specific process is planned as follows. First, calculate the reference ray by conventional method, and define the local ray-base coordinate system along the reference ray. Then, calculate the evolution of the distributions of amplitude and phase on ray-base coordinate step by step. The progress of our extended method will be presented.

Kota Yanagihara
Nagoya Univ.

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