

Particle Simulation of Radio Frequency Waves in Fusion Plasmas

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Motivation: Need for a NL toroidal RF code

Simulation Model:

- Ion: Fully Kinetic
- Electron: Drift Kinetic

Verification of Linear Physics

- Dispersion relation of ion plasma wave, lower hybrid waves, and ion Bernstein waves
- Linear Landau damping of lower hybrid wave on electron
- Linear lower hybrid wave propagation of lower hybrid wave in cylindrical and toroidal geometry using GTC simulation and its comparison with the WKB method
- Lower hybrid wave slow-fast mode conversion

Nonlinear Physics

1. Nonlinear lower hybrid wave trapping of electron

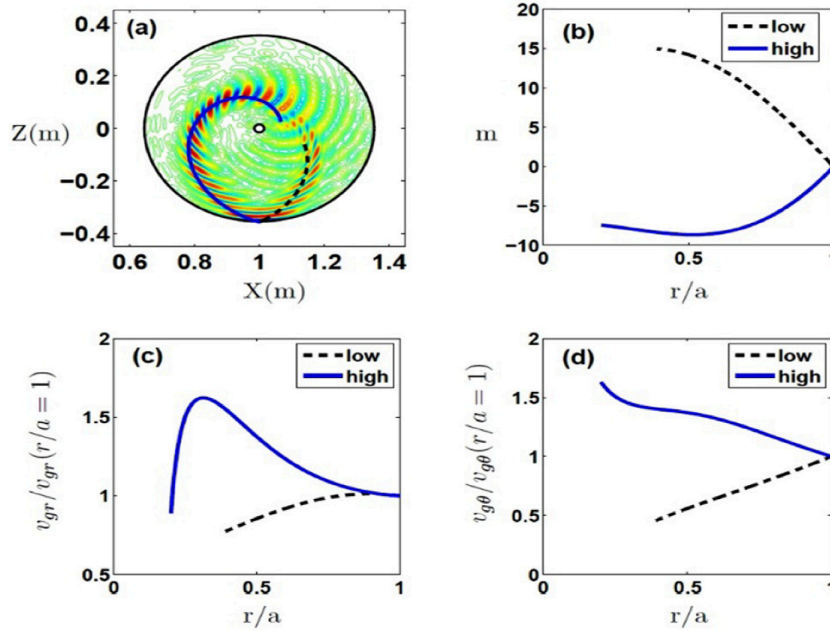


Fig.1 WKB simulation of the ray trajectories is compared to GTC simulation in the toroidal geometry. (b)–(d) are the evolutions of the m number, radial group velocity and the poloidal group velocity of the ray, respectively. The blue solid line represents the ray in the high field side, and the black dashed line represents the ray in the low field side (Jian, PPCF-2014).