

Abstract Submitted
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Fully kinetic simulation of radio frequency wave in fusion plasmas

ANIMESH KULEY, University of California Irvine, USA-92697, Peking University, Beijing 100871, China, ZHIXUAN WANG, ZHIHONG LIN, University of California Irvine, USA-92697 — We are looking into a new nonlinear kinetic simulation model to study the radio frequency heating and current drive of fusion plasmas using toroidal code GTC. In this model ions are considered as fully kinetic (FK) particles using Vlasov equation and the electrons are treated as drift kinetic (DK) particles using drift kinetic equation. This scheme is particularly suitable for plasma heating and current drive with wave frequencies lower than the electron cyclotron frequency, ranging from fast wave and ion cyclotron wave to lower hybrid wave. This model also can handle physics with realistic electron-to-ion mass ratio and nonlinear dynamics in the full torus simulation. The implementation of fully kinetic ions has been verified in the GTC simulation of ion plasma waves. The real frequency measured in GTC agrees very well with theoretical value for various ion temperatures. The ion Debye shielding potential from simulation also agrees with theoretical solution.

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