Abstract Submitted
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Verification of nonlinear particle simulation of radio frequency waves in fusion plasmas[1] ANIMESH KULEY, University of California Irvine, JIAN BAO, Peking University, China, ZHIHONG LIN, University of California Irvine — Nonlinear global particle simulation model has been developed in GTC to study the nonlinear interactions of radio frequency (RF) waves with plasmas in tokamak. In this model, ions are considered as fully kinetic particles using the Vlasov equation and electrons are treated as guiding centers using the drift kinetic [Kuley et al., Phys. Plasmas, 20, 102515 (2013)]. Boris push scheme for the ion motion has been implemented in the toroidal geometry using magnetic coordinates and successfully verified for the ion cyclotron, ion Bernstein and lower hybrid waves. The nonlinear GTC simulation of the lower hybrid wave shows that the amplitude of the electrostatic potential is oscillatory due to the trapping of resonant electrons by the electric field of the lower hybrid wave. The nonresonant parametric decay is observed an IBW sideband and an ion cyclotron quasimode (ICQM). The ICQM induces an ion perpendicular heating with a heating rate proportional to the pump wave intensity.

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