

Simulation of the DIII-D Beam Ion Heating Experiment Using A Monte-Carlo Particle Code Combined With a Full Wave Code

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Abstract

To fully account for finite drift orbit effect of fast ions on wave-particle interaction in ion-cyclotron radio frequency (ICRF) heating experiments in tokamaks, the 5-D finite orbit Monte-Carlo plasma distribution solver ORBIT-RF is coupled with the 2-D full wave code AORSA in a self-consistent way. Comparison results of ORBIT-RF/AORSA simulation against fast-ion D_α (FIDA) measurement of fast-ion distribution as well as CQL3D/ray-tracing simulation with zero-orbit approximation in the DIII-D ICRF wave beam-ion acceleration experiment are presented. Preliminary ORBIT-RF/AORSA results suggest that finite orbit width effects may explain the outward radial shift of the spatial profile measured by FIDA.

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