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Theory Experiment

Simulation of Fast Alfvén Wave Interaction with Resonant Ions in Tokamaks Using Monte Carlo Orbit Code Coupled with Full Wave Code,* M. Choi, V.S. Chan, R.I. Pinsky, R. Prater; *GA*, P. Bonoli, J. Wright, M. Porkolab, V. Tang, R. Parker, *MIT*; L.A. Berry, E.F. Jaeger and the SciDAC RF-Plasma Interactions Team, *ORNL* – Recent DIII-D fast Alfvén FW wave current drive experiments have demonstrated much stronger beam ion acceleration at 4th harmonic than at 8th harmonic. Recent C-Mod fundamental heating experiments have also measured rf-induced non-Maxwellian tails. The Monte-Carlo code, ORBIT-RF provides a comprehensive physics package to investigate the interactions between non-Maxwellian ions with finite orbit and FW. ORBIT-RF coupled with TORIC4 wave fields using a single dominant toroidal and poloidal Fourier mode reproduces qualitatively experimental observations in both C-Mod and DIII-D. This suggests that ORBIT-RF may be used to predictively model the interactions of rf-induced non-Maxwellian ion distribution with FW. To study the contributions of multiple poloidal modes, we will couple the full wave code AORSA to ORBIT-RF to evaluate rf-induced changes in perpendicular energy.

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