

Abstract Submitted
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Comparison of measurements and simulations of fast ion profiles during high harmonic fast wave heating in NSTX¹ D. LIU, W.W. HEIDBRINK, M. PODESTA, UC Irvine, S.S. MEDLEY, PPPL, R.W. HARVEY, CompX, M. CHOI, GA, D. GREEN, ORNL — Combined neutral beam injection (NBI) and high harmonic fast wave (HHFW) heating at cyclotron harmonics accelerate deuterium fast ions in the National Spherical Torus Experiment (NSTX). Acceleration of fast ions above the beam injection energy is evident in the data from neutron, E||B type Neutral Particle Analyzer (NPA), Solid State Neutral Particle Analyzer (SSNPA) array and Fast-Ion D-Alpha (FIDA) diagnostics. The fast-ion spatial profiles measured by the FIDA diagnostic show that the acceleration is at four harmonics (7-10) simultaneously and it is much broader than in DIII-D. This is because of the multiple resonance layers and large orbits in NSTX. The measured spatial profile of accelerated fast ions is farther from the magnetic axis and broader than predicted by the CQL3D Fokker-Planck code, for which we conjecture that finite Larmor radius and banana-width can have significant effects on the fast ions in NSTX. To test this hypothesis, simulations with ORBIT-RF code coupled with full wave code AORSA are in progress.

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