

Abstract Submitted  
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**Interaction between high harmonic fast waves and fast ions in NSTX/NSTX-U plasmas<sup>1</sup>** N. BERTELLI, E.J. VALEO, M. GORELENKOVA, PPPL, D.L. GREEN, ORNL, RF SCIDAC TEAM — Fast wave (FW) heating in the ion cyclotron range of frequency (ICRF) has been successfully used to sustain and control the fusion plasma performance, and it will likely play an important role in the ITER experiment. As demonstrated in the NSTX and DIII-D experiments the interactions between fast waves and fast ions can be so strong to significantly modify the fast ion population from neutral beam injection. In fact, it has been recently found in NSTX that FWs can modify and, under certain conditions, even suppress the energetic particle driven instabilities, such as toroidal Alfvén eigenmodes and global Alfvén eigenmodes and fishbones. This paper examines such interactions in NSTX/NSTX-U plasmas by using the recent extension of the RF full-wave code TORIC to include non-Maxwellian ions distribution functions. Particular attention is given to the evolution of the fast ions distribution function w/ and w/o RF. Tests on the RF kick-operator implemented in the Monte-Carlo particle code NUBEAM is also discussed in order to move towards a self consistent evaluation of the RF wave-field and the ion distribution functions in the TRANSP code.

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