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Fast Ion Interaction with MHD in ICRH Plasmas¹ V.S. CHAN, M.S. CHU, Y. SENTOKU, General Atomics, S.C. CHIU, Sunrise R&M, Inc., T.K. MAU, UCSD, Y.A. OMELCHENKO, Dynamics Research Corp. — An appropriately located fast ion population can effectively stabilize MHD activities such as sawtooth oscillations. This has important consequences on transport and stability in a tokamak. Minority ion cyclotron heating (ICRH) is capable of producing energetic ions localized around the resonance layer, hence can be used as a technique for controlling MHD stability. For comparison with stability theories and experiments, quantitative evaluation of the fast ion distribution is important. The present study uses the ORBIT-RF code [Chan et al., Phys. Plasmas **9**, 501 (2002)], which follows the particle drift trajectories in a tokamak geometry under the influence of RF fields and collisions. The code is benchmarked against linear wave absorption calculations. The fast ion β is calculated as a function of minor radius for various cyclotron resonance locations, and used to evaluate the stabilization on sawtooth oscillations for typical JET tokamak parameters. The effect of sawtooth stabilization on the rotation profile observed on JET during ICRH will be discussed.

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