

Abstract Submitted  
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**Alpha Particle Redistribution due to Sawtooth Instability in ITER**<sup>1</sup> DAVID LIU, NIKOLAI GORELENKOV, ROSCOE WHITE, JANARDHAN MANICKAM, PPPL — The sawtooth crash is known to displace energetic alpha particles out of the core region and into ripple loss orbits, which can decrease heating efficiency, drive Alfvénic instabilities and damage the wall. This study uses the ORBIT guiding center code to examine redistribution in trapped and passing alphas. A time dependent 1/1 helical magnetic perturbation as well as potential gradient equations are added into the code to accurately simulate crash conditions. Several important parameters such as amplitude, crash time, initial surface, energy, orbit width, precession frequency, and ripple were varied to study their effect on the redistribution and loss. Diffusion of passing particles was examined by adding a 2/1 helical mode with a similar sawtooth pattern in order to get significant breaking of flux surfaces and stochasticity in field lines. Different dynamics of trapped and passing alpha redistribution predicted by theory is observed in simulations.

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