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Numerical Simulation of Giant Sawteeth in Tokamaks Using the NIMROD Code[1] D.D. SCHNACK, University of Wisconsin, Madison, WI, S.E. KRUGER, TechX Corp., Booulder, CO, C.C. KIM, University of Washington, Seattle, WA, A.D. TURNBULL, General Atomics, Sam Diego, CA — A minority population of energetic particles can stabilized the n=1 sawtooth mode in tokamaks. This allows for giant sawteeth with long period and large amplitude. The crash can lead to degradation of confinement, NTM and ELMs, and a significant loss of stored energy. This could have important implications for the design and operation of ITER. In order to evaluate the efficacy of the Porcelli model, extensive linear studies have been performed recently to analyze the sawtooth activity in DIII-D discharge #96043 through a sequence of equilibria reconstructed from experimantal data[1]. The results were consistent with the observed sawtooth crash. Here we begin a computational study of the non-linear consequences of the crash of a giant sawtooth using the NIMROD Extended MHD code[2]. We use the series of equilibrium reconstructions considered in Ref. 2. Initial linear results for both MHD and extended MHD, including energetic particle effects, are presented.

[1] M. Choi, A. D. Turnbull, V. S. Chan, et al., Phys. Plasmas 14, 112517 (2007).
[2] C. R. Sovinec, et al., J. Phys. Conf. Ser. 16, 25 (2005).

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