Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

NIMROD Modeling of Transient-Induced NTM[1] E.C. HOWELL, J.R. KING, S.A. KRUGER, Tech-X Corporation, J.D. CALLEN, University of Wisconsin-Madison, R.J. LA HAYE, General Atomics — Extended MHD NIMROD simulations are used to study a neoclassical tearing mode (NTM) induced by an external magnetic perturbation pulse. Simulations use a kinetic reconstruction of a DIII-D ITER baseline scenario discharge and include experimental flow profiles inferred from Charge Exchange Recombination (CER) measurements. In the simulation, a n=1 external magnetic perturbation, containing a broad poloidal spectrum, is applied as a 1 ms pulse. The perturbation initially generates a slowly growing m/n=2/1 seed island. Following the pulse, high-n core modes are destabilized in a sequence. Initially the 6/5, 5/4, and 4/3 modes go unstable. The 6/5 and 5/4 modes saturate as the 4/3 mode grows to large amplitude, and the 3/2 mode is destabilized. As the 3/2 mode grows to a large amplitude, the 4/3 mode saturates while the 2/1 NTM seed island transitions to a phase of rapid growth and becomes dominant. An analysis of the radial induction equation will be presented to investigate how the nonlinear mode interactions drive the increased 2/1 growth.

[1]Work supported by U.S. DOE under DE-SC0018313, DE-FC02-04ER54698, DE-FG02-86ER53218

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Date submitted: 22 Jun 2020 Electronic form version 1.4