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Plasma response modeling of magnetic island bifurcations.[1] DMITRIY ORLOV, University of California, San Diego, TODD EVANS, LASZLO BARDOCZI, WEN WU, General Atomics, ERIC HOWELL, Tech-X Corporation — In this work, we present plasma response simulation of the magnetic island bifurcation in NSTX-U and DIII-D discharges. In tokamaks, naturally occurring MHD islands, such as tearing modes, neoclassical tearing modes, locked modes, and externally driven static magnetic islands produced by RMPs from field-errors and 3D control or EFC coils are known to have significant effects on the confinement of energy, particle and momentum. The initial linear two-fluid M3D-C1 simulations were performed for NSTX-U H-mode plasmas predicting this new class of magnetic island bifurcations. Recently, magnetic island heteroclinic bifurcations were empirically observed in the DIII-D core tokamak plasma for the first time. We expand our understanding of heteroclinic bifurcations in NSTX-U and DIII-D using linear NIMROD simulations in order to determine how this process affects the NTM stability, growth rates, and locking that results in disruptions during discharges with various normalized poloidal pressure and aspect ratios.

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