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**MHD Simulations of Plasma Dynamics with Non-Axisymmetric Boundaries**[1] CHRIS HANSEN, University of Washington, JEFFREY LEVESQUE, Columbia University, KYLE MORGAN, THOMAS JARBOE, University of Washington — The arbitrary geometry, 3D extended MHD code PSI-TET is applied to linear and non-linear simulations of MCF plasmas with non-axisymmetric boundaries. Progress and results from simulations on two experiments will be presented: 1) Detailed validation studies of the HIT-SI experiment with self-consistent modeling of plasma dynamics in the helicity injectors. Results will be compared to experimental data and NIMROD simulations that model the effect of the helicity injectors through boundary conditions on an axisymmetric domain. 2) Linear studies of HBT-EP with different wall configurations focusing on toroidal asymmetries in the adjustable conducting wall. HBT-EP studies the effect of active/passive stabilization with an adjustable ferritic wall. Results from linear verification and benchmark studies of ideal mode growth with and without toroidal asymmetries will be presented and compared to DCON predictions. Simulations of detailed experimental geometries are enabled by use of the PSI-TET code, which employs a high order finite element method on unstructured tetrahedral grids that are generated directly from CAD models. Further development of PSI-TET will also be presented including work to support resistive wall regions within extended MHD simulations.

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