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Nonlinear MHD Simulation of Negative Central Shear Discharges in the DIII–D Tokamak[1] A.M. POPOV, Y.Q. LIU, *Moscow State University*, A.D. TURNBULL, M.S. CHU, *General Atomics* — The nonlinear stability properties of DIII–D negative central magnetic shear discharges have been analyzed with a new nonlinear three-dimensional MHD code NFTC. The NFTC code solves the full (non-reduced, compressible) MHD equations in general toroidal geometry using a straight field line flux coordinate system. The effects of plasma rotation in the presence of resistivity and viscosity are included in the system of equations. A possible explanation of disruptions in negative magnetic shear discharges was found on the basis of nonlinear calculations.

The nonlinear resistive evolution shows two stages. At first, interchange instability of the initial rotating steady state leads to stochastization in the region of negative magnetic shear. The resulting saturated steady-state with slightly changed q-profile and suppressed rotation is found to be metastable. The resistive-kink mode is then triggered which results in stochastization over most of plasma volume.

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