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Simulations of High betaN*H Advanced Tokamak Discharges in DIII-D with the 3D Nonlinear Code NFTC[1] A.M. POPOV, N.N. POPOVA, Moscow State University, V.S. CHAN, R.J. LA HAYE, A.D. TURNBULL, General Atomics, M. MURAKAMI, Oak Ridge National Laboratory — Nonlinear self-consistent MHD stability simulations of neoclassical tearing modes (NTM) in high β_N Advanced Tokamak (AT) are presented. Radially localized electron cyclotron current drive (ECCD) current profile control is considered based on DIII-D discharge #99411 in which $\beta_N = 3.9$ and $H_{89P}-$factor $= 2.9$ are reached. Simulations were performed with the full 3D nonlinear code NFTC. Neoclassical terms are included in the basic equations for the magnetic field and pressure. An effective fully implicit numerical scheme allows the transport profile to evolve self-consistently with the nonlinear MHD instabilities and an externally applied source such as ECCD. NTM activity with $m/n = 2/1$ is found in simulations to correspond to experiment. It is shown that magnetic islands could be quickly suppressed by localized ECCD at $q = 2$ before the mode grows substantially. The possibility of q-profile modification by ECCD well before MHD activity to keep $q_{min} > 2$, so that the discharge evolves stably is also discussed.

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☐ Prefer Oral Session
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Special instructions: MHD, immediately following FW Perkins

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