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Modeling of Edge Harmonic Oscillation in DIII-D QH-mode Discharges[1] A.Y. PANKIN, Tech-X Corp., XI CHEN, GA, J.R. KING, Tech-X Corp., K.H. BURRELL, A.M. GAROFALO, R.J. GROEBNER, GA, S.E. KRUGER, Tech-X Corp., G.R. MCKEE, U. Wisconsin-Madison, T. RAFIQ, Lehigh U., Z. YAN, U. Wisconsin-Madison — In this research, the extended MHD NIMROD code is used to simulate the dynamics of EHOs during the early stage of the QH-discharge 163518. Edge Harmonic Oscillations (EHOs) observed in the DIII-D experiment are successfully reproduced in these nonlinear NIMROD simulations. Similar to the previous NIMROD results of broadband QH regime in another DIII-D discharge [J.R. King *et al.* Phys. of Plasmas (2017) 055902], we show that the rotation is essential for the formation of the saturated EHO states. For these long simulations that are comparable to the transport times, a correct balance between particle and energy sources and sinks becomes important. The simulation with a more advanced transport model that has been implemented in NIMROD yields a more realistic H-mode pedestal transport. The model includes a description of sources and radial profiles for particle and energy transport coefficients. It is shown that the relaxation of plasma profiles depends on the initial profiles and instability saturation levels. In order to facilitate the model validation, the synthetic BES diagnostic has been implemented in the NIMROD framework. A comparison between the density perturbations obtained in the simulations with the experimental BES measurements show qualitatively similar behavior.

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