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Predictive Modeling of DIII-D Tokamak Discharges[1] VICTOR GENTY[2], TARIQ RAFIQ, ARNOLD KRITZ, Lehigh University, ALEXEI PANKIN, Tech-X Corp. — This research focuses on validating the Multi-Mode anomalous transport module MMM7.1, recently installed in the PTRANSP code and available in the National Transport Code Collaboration library, w3.pppl.gov/ntcc. The MMM7.1 module is used to compute anomalous thermal, particle and toroidal angular momentum transport. MMM7.1 includes models for electron and ion temperature gradient, trapped electron, MHD, kinetic ballooning and drift resistive inertial ballooning modes. Simulations of DIII-D tokamak discharges are carried out using the PTRANSP predictive integrated modeling code with boundary conditions taken from evolving experimental data. The discharges simulated in the validation study of MMM7.1 include DIII-D Ohmic, L-mode, H-mode plasmas and plasmas with co- and counter-rotations. The time evolution of temperature, toroidal angular frequency and current density profiles predicted using the MMM7.1 transport module are compared with corresponding data from DIII-D tokamak discharges for which analysis is available in the ITPA database. For each class of DIII-D discharges studied in this research, RMS deviations are reported. Differences in predictions of plasma profiles for different plasma parameter regimes are discussed.

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