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Global Turbulence Calculations with GEM for Experimental Cases and Experimental Comparisons[1] G. REWOLDT, D. MIKKELSEN, PPPL, Y. CHEN, S. PARKER, U. Colorado-Boulder — The GEM code is capable of global nonlinear turbulence calculations for experimentally-realistic cases, including trapped electrons, deuterium ions, carbon impurity ions, and hot beam ions, with electron collisions and electromagnetic effects, using a model MHD equilibrium with ellipticity and triangularity. For cases for the core region only of tokamaks such as NSTX and DIII-D, when the experimental level of the equilibrium ExB velocity is included, the cases are often completely stable, while if the ExB velocity is set to zero the cases can become unstable. However, even including the experimental ExB velocity, if the edge (pedestal) region also is included in the computation domain, the cases can be unstable, grow linearly, and saturate nonlinearly. In particular, the linearly stable core region could then have a significant level of anomalous transport, which would be evidence of turbulence spreading. For one particular NSTX case where the experimental ion energy transport is anomalous, the saturated GEM level of transport matches this in the edge region, but dies off more quickly radially going into the core region than the experimental transport. Results will be presented and discussed.

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