Abstract Submitted
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The dependence of TEM turbulence on magnetic geometry in the HSX stellarator[1] J. SMONIEWSKI, B.J. FABER, M.J. PUESCHEL, K.M. LIKIN, C.B. DENG, J.N. TALMADGE, University of Wisconsin, Madison — The Helically Symmetric eXperiment (HSX) is equipped with a set of auxiliary coils that can modify the designed Quasi-Helical Symmetry (QHS), and is well suited to probe the effect of geometry on turbulence. Configuration optimization to reduce turbulent transport could provide the next big confinement improvement in fusion devices. The first step towards optimization is to develop a predictive understanding of the relevant physics. Particularly in the case of density-gradient-driven TEM turbulence relevant to HSX scenarios, quasilinear models fail to predict transport. Here, moving beyond linear physics, nonlinear GENE simulations in the large density gradient region are compared in the QHS configuration, and in a configuration where the symmetry is broken by the addition of mirror terms to the magnetic spectrum. Investigations into zonal flow physics provide another perspective into differences between geometries. In parallel, power balance on experimental profiles in each configuration provides a scaling of electron thermal diffusivity χ_e with electron temperature and density gradient as a first step towards direct comparison to experimental fluctuation measurements.

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