Abstract Submitted
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Theory Based Transport Modeling of B=0.5 T, ECRH Plasmas in HSX[1] W. GUTTENFELDER, D.T. ANDERSON, J.M. CANIK, K.M. LIKIN, J.N. TALMADGE, HSX Plasma Laboratory, University of Wisconsin-Madison — Theory based models for both neoclassical transport [1] and ITG/TEM anomalous transport [2] are used to predict density and temperature profiles in the HSX stellarator. Although the axisymmetric ITG/TEM model of [2] can not treat 3D geometry effects, recent 3D gyrokinetic linear stability calculations [3] have demonstrated the impact of the local geometry on ITG/CTEM linear growth rates in stellarators. As an approximation to the results of [3], the largest value of local bad curvature in the low field/ballooning region of HSX is used in the evaluation of [2], with no free fit parameters. The model input particle and ECRH power source rates are determined from 3D neutral gas simulations and ray tracing calculations, respectively. The predicted density and temperature profiles are in reasonable quantitative agreement with a number of experimental profiles in the quasi-helically symmetric configuration. The model also predicts profile changes similar to experiment in a configuration with the quasi-symmetry intentionally degraded. [1] J.N. Talmadge et al., Fus. Sci. & Tech. **46**, 255 (2004) [2] H. Nordman et al., Nucl. Fusion **30**, 983 (1990) [3] G. Rewoldt et al., Phys. Plasmas **12**, 102512 (2005)

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