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Configuration Optimization for Turbulent Transport in HSX¹ JOSEPH TALMADGE, JASON SMONIEWSKI, KONSTIN LIKIN, CHUANBAO DENG, University of Wisconsin-Madison, JOSEFINE PROLL, Max Planck Institute for Plasma Physics, Greifswald, Germany, HARRY MYNICK, SAMUEL LAZ-ERSON, Princeton Plasma Physics Laboratory — Experimental measurements of the thermal diffusivity in the Quasihelically Symmetric (QHS) configuration have demonstrated that the neoclassical transport has been reduced so that the thermal diffusivity throughout the plasma is dominated by turbulence [1,2]. With advances in gyrokinetics and optimization codes, it has now become possible to assess whether 3D shaping can enhance or reduce turbulent transport in a computationally predictable manner [3]. Our starting point in this campaign is the experimental observation that the turbulent diffusivity in the region of maximum density gradient (0.5 < r/a < 0.7) is about a factor of two larger in a configuration in which the quasisymmetry has been intentionally degraded [2]. Preliminary results indicate that the numerically calculated heat flux using the GENE code is higher for the configuration with the degraded neoclassical transport. In this poster we will summarize the progress to date, discuss other possible magnetic configurations that have larger computed turbulent heat flux than the QHS geometry and lay out the near-term program in terms of diagnostic upgrades. [1] J. Canik et al., PoP 14, 056107 (2007) [2] Jeremy Lore, UW Ph.D. thesis [3] H. E. Mynick et al., PPCF 56, (2014) 094001

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