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Transport Studies in HSX at 1 Tesla J. LORE, D.T. ANDERSON, J.M. CANIK, K.M. LIKIN, J.N. TALMADGE, K. ZHAI, HSX Plasma Laboratory, U. of Wisconsin-Madison — To further investigate the effect of quasi-symmetry on neoclassical and anomalous transport, the HSX stellarator has recently begun regular operations at a magnetic field strength of 1 Tesla. Transport studies at 0.5 Tesla demonstrate that the electron thermal diffusivity is a factor of two smaller in the core for the Quasi-Helically Symmetric (QHS) configuration as compared to the configuration with the symmetry intentionally degraded (Mirror) due to a reduction in neoclassical transport [1]. Thermal transport analysis was complicated at 0.5 Tesla by the presence of an ECH driven suprathermal electron population, which is reduced in the higher density plasmas possible at 1 Tesla. It has also been observed that, for an identical injected power, the central temperature is double that of Mirror, with the same line averaged density in each case. A transport analysis will be presented showing the effect of higher field strength, density and injected power on electron thermal diffusivity in QHS and Mirror. This work is supported by DOE Grant DE-FG02-93ER54222.

[1] J.M. Canik et al., Phys. Rev. Letters 98, 085002 (2007)

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