Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Particle Transport in HSX JOHN CANIK, DAVID ANDERSON, SIMON ANDERSON, JOSEPH TALMADGE, KAN ZHAI, HSX Plasma Lab, UW-Madison — The density profile in the Quasi-Helically Symmetric (QHS) configuration is centrally peaked for both on- and off-axis heating. In contrast, for a magnetic configuration with the symmetry broken (Mirror), the density profile is flat or slightly hollow with on-axis heating and a centrally peaked temperature profile. When the ECH resonance is moved off-axis, the temperature profile becomes flat inside the heating radius, and the density profile becomes peaked. To understand particle transport in HSX, experimental data from a set of absolutely calibrated H_α detectors has been coupled to simulations using the DEGAS[1] neutral gas code. These calculations yield the particle source rate, which can be integrated to give the steady state radial particle flux. It is found that in QHS plasmas, the experimental particle flux is much larger than the neoclassical flux. In Mirror plasmas, the neoclassical flux is comparable to experiment in the core ($r/a < 0.4$). In this region, the thermodiffusive flux is the dominant term in the total neoclassical particle flux, suggesting that neoclassical thermodiffusion is the cause of the hollow density profile in the nonsymmetric configuration. This work is supported by DOE Grant DE-FG02-93ER54222.

[1]Heifetz, D.B. *et al*, J. Comp. Phys. **46,** (1982) 309

John Canik
HSX Plasma Lab, UW-Madison

Date submitted: 26 Jul 2005 Electronic form version 1.4