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Finite Plasma Flow Close to the Magnetic Axis in HSX[1] JOSEPH TALMADGE, SANTHOSH KUMAR, University of Wisconsin - Madison, YASUHIRO YAMAMOTO, SADAYOSHI MURAKAMI, Kyoto University — Profiles of the impurity ion mean parallel flow and radial electric field in HSX are measured using charge exchange recombination spectroscopy (CHERS). The technique involves measurement of the ion parallel flow at two locations on a flux surface. The parallel flow close to the plasma core is measured to be approximately 10 km/s for the Quasihelically Symmetric (QHS) configuration and up to 20 km/s in a magnetic geometry in which the quasihelical symmetry is intentionally degraded. In this same region, the pressure gradients are small, making it difficult to understand how the flow remains finite. One proposed explanation for the finite flow is that there is a torque on the plasma due to an ECH driven suprathermal electron flux. The flux is calculated using the GNET code and the fluid equation approach is used to model the evolution of the plasma flow and ambipolar radial electric field in HSX. The magnetic field spectrum in Hamada coordinates is used to calculate the plasma viscosity. Included in the model is momentum damping due to neutrals, which is significant for the low density, ECRH heated plasmas. Initial results indicate that the calculated parallel flow due to the ECH-driven torque is on the order of the measured flow.

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