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Neoclassical Predictions of "Electron Root" Plasmas at HSX JEREMY LORE, DAVID ANDERSON, ALEXIS BRIESEMEISTER, JOSEPH TALMADGE, KAN ZHAI, HSX Laboratory, University of Wisconsin-Madison, USA, WALTER GUTTENFELDER, University of Warwick, U.K., DON SPONG, Oak Ridge National Laboratory, USA — Recent neoclassical transport calculations at HSX for discharges with very peaked electron temperature profiles $(T_e(0)>2.5 \text{keV})$ show predictions of large (>400 V/cm) radial electric fields in the plasma core. The existence of this "electron root" is due to the ion poloidal resonance with $T_e >> T_i$, and it is predicted to have an effect on both neoclassical and anomalous transport. Calculations were made using the DKES code [1], which uses a non-momentum conserving collision operator. Initial results will be shown from the PENTA code [2] based on a moments method which recovers the effects of momentum conservation by including effects of the parallel flows. Results of plasma density and ECRH power scans will be presented as investigations into the experimental existence of the 'electron root' and possible internal transport barrier formation. [1] W.I. van Rij and S.P. Hirshman, Phys. Fluids B 1, 563 (1989) [2] D.A. Spong, Phys. Plasmas 12, 056114 (2005) This work is supported by DOE Grant DE-FG02-93ER54222.

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