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Wall Conditioning for 1T Operation in HSX[1] A. HERR, C. CLARK, F.S.B. ANDERSON, D.T. ANDERSON, HSX Plasma Laboratory, University of Wisconsin-Madison — The Helically Symmetric Experiment (HSX) routinely runs electron cyclotron resonance heating discharges with 0.5T field on axis with stainless steel walls conditioned with helium glow discharge cleaning. When the main field is increased to 1T, impurity fueling makes density control impossible. Three techniques are explored to sustain 1T plasmas: carbonization, introduction of a limiter, and boronization. Carbonization is performed with a methane glow discharge and shows large recycling but low impurity radiation even for high injected power. A small carbon limiter is placed in the plasma to reduce wall interactions and cuts impurity influx enough to obtain stable dischages. Boronization of the HSX vacuum vessel is carried out with the solid boron precursor o-carborane. This powder is heated to form a vapor that is injected into HSX from four ovens distributed around the machine. A number of collection coupons are inserted at the vessel wall to measure film characteristics. Results are shown including Thomson scattering and spectral measurements for the three wall conditioning methods.

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