

Abstract Submitted
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Measurement of the Bootstrap Current in HSX¹ J.C. SCHMITT, J.N. TALMADGE, K. ZHAI, J.M. CANIK, HSX Plasma Laboratory, U. of Wisconsin-Madison — The bootstrap current in the quasihelically symmetric stellarator HSX is in the opposite direction to that in a tokamak, reducing the rotational transform but at the same time reducing particle excursions from flux surfaces. Knowledge of the bootstrap current is critical to predicting operation of advanced stellarators. The current as measured with an external Rogowski coil in HSX rises throughout the discharge on a 10-40 ms timescale and approaches a maximum value between 100-300A. Profiles are measured with a 10-chord Thomson scattering system, showing central electron temperatures up to 700 eV and peak densities of $4 \times 10^{12} \text{ cm}^{-3}$. Both the equilibration time and maximum value can be adjusted by variation of the electron pressure profile and associated gradients. Reversal of the magnetic field reverses the direction of the toroidal current. Theoretical models used to predict and model the bootstrap current will be presented. Initial estimates predict between 200-400A, consistent with the measured values.

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