

Abstract Submitted  
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**Spheromak Current Drive Direction and Flipping in HIT-SI<sup>1</sup>** B.S. VICTOR, D.A. ENNIS, T.R. JARBOE, B.A. NELSON, R.J. SMITH, A.M. KIRKPATRICK, University of Washington — The Helicity Injected Torus with Steady Inductive current drive (HIT-SI) experiment uses two inductive plasma injectors to drive magnetic helicity into the confinement region. The direction of the spheromak current in the confinement region is dependent upon the sign of the helicity and the orientation of the injector with respect to the confinement region. Injectors driving helicity of the same sign and positioned on opposite sides of the confinement region have opposing directions of preferred spheromak current direction. However, helicity balance dominates the preferred direction of current drive. Operating the injectors with the same helicity sign produces higher spheromak currents than single-injector operation, but with reversals in the spheromak current direction on time intervals long compared to the injector frequency. A newly constructed, three-pronged probe containing arrays of 3D pickup coils, inserted to the magnetic axis, is used to measure the effects of the helicity sign on the magnetic field profile. Ratios of current density to electron density, as measured by an FIR interferometer, approaching  $10^{-14}$  A·m have been measured, demonstrating improvement from past plasma performance.

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