

Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

HIT-SI Injector Voltage Measurements Using Injector Langmuir Probes RABIH ABOUL HOSN, ROGER SMITH, THOMAS JARBOE, University of Washington — A pair of Langmuir probe arrays have been designed and built to measure floating potentials of the plasma at the injector mouth of the HIT-SI device. The Helicity Injected Torus using Steady Inductive Helicity Injection (HIT-SI) [1,2] is a “bow tie” spheromak using an electrodeless formation and sustainment concept. HIT-SI is powered by two inductive helicity injectors operated in quadrature to maintain a constant helicity injection rate. The electric probes consist of an array of four floating potential Langmuir probes measuring the voltage distribution in each injector from the shell to midpoint of the injector mouth. The probe measurements combine to determine the part of the injector loop voltage driving the $n = 0$ spheromak equilibrium region. Preliminary data suggest the spheromak voltage is the loop voltage minus the nearly constant injector voltage of 150-180 volts. These probe data will be used to calculate the helicity decay time of the spheromak. [1] T. R. Jarboe. Steady inductive helicity injection and its application to a high-beta spheromak. *Fusion Technology*, 36(1):85–91, July 1999. [2] P.E.Sieck et al., “Demonstration of Steady Inductive Helicity Injection”, *Nuc. Fusion*, in press (2006).

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Date submitted: 19 Jul 2006

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