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**Internal Magnetic Field Measurements and Langmuir Probe Results for the HIT-SI Experiment** R.J. SMITH, T.R. JARBOE, B.A. NELSON, A.J. REDD, W.T. HAMP, R.G. O'NEILL, P.E. SIECK, G.L. SUTPHIN, J.S. WROBEL, University of Washington — HIT-SI is a spheromak device in which the plasma is generated and sustained by steady inductive helicity injection. Helicity injection is maintained at a constant rate by means of two AC RFP sources phased in quadrature and connected to the main chamber so as to drive a rotating n=1 mode at 5kHz. A magnetic probe consisting of three separated radial arrays of 3d coils has been designed to allow the direct measurement of the plasma current and induced electric fields using finite differences of the magnetic field components. The probe is insertable at the mid-plane to a depth of 15cm. Langmuir probes have been built to study the edge plasma at the mid-plane and the injector openings. Measurements of the internal magnetic field structure, plasma current, poloidal and toroidal flux distributions along with Langmuir probe results are presented for HIT-SI operations over an operation space of varying injector voltage, injector flux and fill density.

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