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**Ion Doppler Spectroscopy and Far Infrared Interferometry on the HIT-SI spheromak** R.G. O'NEILL, R.J. SMITH, A.J. REDD, T.R. JARBOE, University of Washington — Ion Doppler Spectroscopy (IDS) is used to measure impurity ion velocity and temperature on HIT-SI. The spectrometer uses a 16 channel photo multiplier to track temperature and velocity continuously through the discharge. The spectrometer can view into the HIT-SI injector region as well as into the equilibrium region. Temperature and velocity data will be presented. A tangentially viewing far infrared (FIR) interferometer is being configured to measure electron density on HIT-SI. The system will use a two optically pumped difluoromethane gas lasers to produce a heterodyne signal. It will provide more power, higher heterodyne beat frequency, and improved signal to noise ratio over the older FIR system it replaces. The system can achieve a heterodyne beat of up to 2 MHz compared to the older system frequency 250 kHz. The increased frequency is required to track density fluctuations on HIT-SI. An update on the status of the FIR system will be presented.

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