Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Spectral line emission from helicon heated plasmas[1] T.M. BIEWER, R.H. GOULDING, D.L. HILLIS, R. ISLER, S. MEITNER, ORNL, Oak Ridge, TN, USA — There has been a resurgence of interest in linear plasma devices as a method to study plasma-material interfaces under high power and particle flux. As the size and power of the linear machines is increased they yield important results for fusion-grade toroidal devices such as ITER and DEMO. A 5 cm diameter helicon plasma source developed at ORNL routinely provides high density ($n_e \geq 10^{19}$ m^{-3}) hydrogen plasmas for ion source development and other work. Recently, a 15 cm diameter, 1.5 m long linear machine has been built at ORNL using a new helicon antenna designed for input powers up to 100 kW, producing a plasma that will be used to bombard material targets. Visible spectroscopy has been used to measure emission line spectra of the helicon heated plasma from 200 nm to 1100 nm in real time at low resolution. Moreover, a separate diagnostic has been used to measure the intrinsic spectra of He II light from 10 sightlines to estimate the ion temperature and flow velocities (radial, axial, and azimuthal) at multiple axial locations in the device. Data from these diagnostics will be shown and their interpretation discussed.

[1]This work was supported by the US. D.O.E. contract DE-AC05-00OR22725.

Theodore Biewer
Oak Ridge National Laboratory

Date submitted: 14 Jul 2010 Electronic form version 1.4