Abstract Submitted
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Emission Spectroscopy of RF Helicon Heated Plasmas[1] T.R. YOUNKIN, Oak Ridge National Laboratory; Department of Physics and Astronomy, University of Tennessee-Knoxville, T.M. BIEWER, R.H. GOULDING, D.L. HILLIS, R. ISLER, Oak Ridge National Laboratory — In order to study plasma-material interfaces under high power and particle flux, large linear machines are being constructed that can effectively simulate conditions that will be found in fusion-grade toroidal devices such as ITER and DEMO. 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 at low resolution. The spectrometer is thoroughly calibrated for wavelength and intensity in order to determine electron density and temperature using the ratios of spectral line intensities. A variety of gas species have been heated, including hydrogen, deuterium and helium. Residual amounts of foreign materials can be monitored near the plasma-wall interface. Results on how magnetic field scans, probe scans, and power scans affect the plasma will be analyzed and presented.

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Tim Younkin
ORNL

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