Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Density and temperature maxima at specific w and B MATTHEW BALKEY, LANL, EARL E. SCIME, West Virginia University, JOHN L. KLINE, PAUL KEITER, LANL, ROBERT BOIVIN, Auburn University — We report measurements of electron density and perpendicular ion temperatures as a function of driving frequency and magnetic field strength in an argon helicon plasma for five different RF antennas: a Nagoya type III antenna, a "Boswell" saddle coil antenna, a 19 cm long m=+1 helical antenna, a 30 cm long m=+1 helical antenna, and a 19 cm long m=+1 helical antenna with narrow straps. The experimental results clearly indicate that for all antennas, the electron density is maximized at a significantly different RF frequency than the frequency, which yields the maximum ion temperature. Ion temperatures in excess of 1 eV for 750 W of input power are observed. These results suggest that the mechanisms responsible for coupling energy into the ions and electrons are distinct and therefore helicon sources can be configured to maximize electron density without simultaneously maximizing the perpendicular ion temperature.

Matthew M. Balkey
LANL

Date submitted: 20 Jul 2007 Electronic form version 1.4