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Excited Ar II Emission Characteristics in Helicon Plasmas
JOHN SCHARER, CHRISTOPHER DENNING, MATT WIEBOLD, University of Wisconsin-Madison, ALEX DEGELING, University of Alberta, ROD BOSWELL, Australian National University — Wave field, peak Ar II 443 nm emission, and antenna code modeling have shown phase velocities in helicon sources that are in close agreement for moderate density and magnetic field (n_e =1.2-4 x 10^{12} /cc and 100-200 G) experiments at the Australian National University and University of Wisconsin. The phase velocities correspond to parallel electron energies in the range of 16-46 eV and the peak electron density occurs 10-15 cm from the end of the antennas indicating that fast accelerated electrons may play a role in helicon source operation. Higher plasma density experiments (>2-8x10^{12} cm^{-3} and higher magnetic fields) on the Australian National University and University of Wisconsin helicon facilities have both shown a peak excited Ar II 443 nm rf modulated emission signal that is in phase along the direction parallel to the magnetic field when the plasma is in the dense helicon (or "blue") mode. Interpretations of these observations and recent measurements will be presented.

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