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High Power Helicon 2 (HPH2) JAMES PRAGER, TIMOTHY ZIEMBA, ROBERT WINGLEE, JOHN SLOUGH, JOHN CARSCADDEN, University of Washington — The high power helicon source, developed at the University of Washington and MSNW, is capable of depositing up to 100 kW of peak power into the plasma. High input powers are obtained using a low impedance, solid state switching power supply, which produces peak oscillating antenna currents up to 2.4 kA. Typical operational frequencies are from 0.3 to 1.1 MHz with optimum performance seen near 600 kHz. The HPH system has been operated in a pulsed manner with shot durations ranging from 30 μs to several milliseconds, with ambient magnetic field strengths (B0) ranging from 60 to 500 G. Measured source plasma densities in Argon are near 2x10^{20} m^{-3} with electron temperatures of 5-7 eV. Langmuir probe measurements, at the exit of the source and further downstream, show a peaked spatial profile. Both the time of flight and Mach probe measurements indicate a supersonic axial flow. The ion energy distributions show a dual peaked population flowing downstream from the discharge. Maximum sustained directed ion energies using Argon are near 55 eV. The results to be presented include ion energy distributions, spectroscopic data, power loading, and density profiles.

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