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Enhanced Output from the High Power Helicon Resulting from Modification of the Downstream Magnetic Field with a Magnetic Nozzle RACE ROBERSON, ROBERT WINGLEE, TIM ZIEMBA, JAMES PRAGER, University of Washington — The high power helicon plasma source developed at the University of Washington is capable of transferring tens of kilowatts of power into the plasma with source plasma densities near $2x10^{20}m^{-3}$. The helicon operates with a B_0 magnetic field of .2 to .6 kG on axis that diverges with axial distance from the source. The addition of a magnetic nozzle downstream of the source region increases the magnetic field along the source axis and limits the divergence of the magnetic field at the source exit. Optical emissions from the plasma show an intense axially peaked central plasma core, typical of a helicon discharge. Light emission occurs outside of the source region within one antenna length downstream, and with the addition of the nozzle the optical emission region extends more than one antenna length. Density along the source axis is increased downstream as expected and time of flight estimates show an increase in bulk plasma velocity downstream of the nozzle. Measurements of plasma density with Langmuir probes and ion energies with a retarding field energy analyzer will be presented.

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