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Progress on the Madison Mirror Helicon[1] MARCEL GRANETZNY, JAY ANDERSON, MIKE CLARK, OLIVER SCHMITZ, CARY FOREST, University of Wisconsin - Madison, MADISON MIRROR HELICON TEAM — The Madison Mirror Helicon (MadMiriCon) is revitalizing US mirror research with possible applications in fusion research, basic plasma physics and as a cost-effective neutron source for medical isotope production and fusion material testing. The plasma is confined inside a quartz tube connected to stainless steel expansion tanks on both ends with a total plasma length of 3.5 m and a central plasma diameter of 7 cm. Fully steady-state plasmas are created using a right-handed helicon antenna at 10 kW RF power. The solenoid guiding field can reach 0.3 T and has very strong flaring inside the expanders. Experimental goals include demonstration of MHD stability in a plasma with strongly magnetized ions and high electron temperature and density, suitable for NBI absorption. We give an overview of how to achieve 10 kW input power while maintaining control over the various machine subsystems and diagnostics in a high EMI environment. Efforts to stabilize the helicon mode in lieu of the strong field flaring are shown. We present measurements for electron density scaling with RF power and magnetic field and a comparison to the helicon dispersion relation. An outline of upcoming developments, e.g. installation of two 15-20 Tesla range HTS mirror coils is given.

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