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ECH on the Madison Plasma Dynamo Experiment[1] JASON MILHONE, CAMI COLLINS, University of Wisconsin, ALF KOEHN, IGVP, University of Stuttgart, CARY FOREST, University of Wisconsin, MPDX TEAM — The Madison Plasma Dynamo Experiment (MPDX) is a 3 meter diameter spherical vessel lined with 3000 SmCo permanent magnets (B >3 kG) that create an axisymmetric multi-cusp ring for confining the plasma. The MPDX is designed to study flow driven MHD instabilities and dynamo action in the regime of high magnetic Reynolds number Rm=vL/η. This will be achieved through electron cyclotron heating of the electrons leading to good electrical conduction and large ionization fraction. The system consists of five 20 kW, CW magnetrons operating at 2.45 GHz. The system will be described in detail, including the power supplies, RF vacuum feedthroughs, and modulator/regulator circuit used to control the magnetrons. The power will be injected at various latitudes and is resonant at the fundamental cyclotron frequency in the multi-cusp edge. Prototype experiments in a smaller version of the device routinely operate in a density regime that is overdense. Experiments and numerical modeling will be described that determine how the power is absorbed in this mode.

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