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ECH on the Madison Plasma Dynamo Experiment JASON MILHONE, MIKE CLARK, CAMI COLLINS, CHRIS COOPER, NOAM KATZ, PAUL NONN, JOHN WALLACE, CARY FOREST, University of Wisconsin - Madison — The Madison Plasma Dynamo Experiment (MPDX) is a 3 meter diameter sphere consisting of 36 axisymmetric rings of samarium cobalt magnets in a ring-cusp configuration. Electrostatic electrodes on the edge will be used to spin the plasma. The purpose of MPDX is to study flow-driven magnetohydrodynamic instabilities. Electron cyclotron heating will be used for the ionization and heating of the plasma. A benefit of the ECH is the plasma will have hot electrons leading to good electrical conduction and high magnetic Reynolds number. In addition, direct heating of the electrons helps to obtain a large ionization fraction and a low neutral density. The ECH system on MPDX will consist of 5 separate lines distributed at various positions around the vacuum vessel. Each line will have a 20 kW magnetron operating in continuous wave mode at 2.45 GHz outputting in WR-340 waveguide. The power will be transferred to the vacuum vessel through WR-284 waveguide. Each line will contain a directional coupler for measuring reflected power. A manual 3-stub tuner will be used for impedance matching. The purpose of these elements is to optimize the efficiency of energy transfer to the plasma.

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