Abstract Submitted for the DPP10 Meeting of The American Physical Society

Study of Alfvén Eigenmodes on the Madison Symmetric Torus J.J. KOLINER, C.B. FOREST, University of Wisconsin - Madison, D. SPONG, Oak Ridge National Laboratory, J.S. SARFF, S.P. OLIVA, J.K. ANDERSON, A.R. ALMAGRI, University of Wisconsin - Madison — Alfvén waves are likely of fundamental importance in the reversed-field pinch (RFP). Unstable tearing fluctuations can inject energy into Alfvén modes, which could excite broadband magnetic turbulence and anomalous ion heating. An effort is in progress to understand toroidicityinduced Alfvén eigenmodes (TAE's) through their structure, driving terms and damping mechanisms on the MST. Coupling of multiple continuum modes can introduce undamped Alfvén eigenmodes with frequencies up to 1 MHz. These modes can also become unstable by inverse Landau damping due to fast ions, a condition pertinent to neutral beam injection heating on MST and fusion alpha particles in future RFP devices. Frequencies of weakly damped modes have been calculated by solving a 3D partial differential equation that describes shear Alfvén dynamics numerically based on MST equilibrium conditions. To excite the calculated modes, a single strap poloidal antenna connected to a 1 kW broadband amplifier will be employed. A toroidal array of 32 fast magnetic loops resolves power spectra and mode numbers in the relevant range of frequencies. Preliminary data indicates some coherent magnetic activity below TAE frequency ranges. Supported by USDoE and NSF.

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Date submitted: 19 Jul 2010

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