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MRI in Helicon Plasma C. COLLINS, UW-Madison, H. JI, PPPL, C. KAITA, U. Michigan — Magnetorotational instability (MRI) theory is a basis for explaining efficient angular momentum transport and magnetic field amplification in accretion disks. Observation of MRI in a laboratory plasma would enhance our understanding of how accretion occurs in a range of astrophysical objects, including planet and star forming systems, galactic nuclei, and black holes. Depending on plasma parameters, it may be possible to experimentally identify effects beyond ideal MHD in MRI theory. Here, a helicon plasma is produced by a flat spiral RF antenna in weak (< 250 Gauss) axial magnetic field. Ring electrodes are biased to create a radial electric field that induces plasma rotation through ExB drift. To study plasma responses to such biases, plasma potential and ion flow velocities are measured with emissive and Mach probes. When the ions are unmagnetized, the Hall effect becomes important. This leads to growth rates that depend on whether the magnetic field is parallel or anti-parallel to the rotation axis. An initial analysis to experimentally decipher signatures of incompressible, dissipative two-fluid MRI from other phenomena in a rotating plasma will be presented.

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