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Taylor-Dean flow on the Plasma Couette Experiment (PCX) K. FLANAGAN, M. CLARK, C. COLLINS, C. COOPER, I. KHALZOV, J. WALLACE, C. FOREST, University of Wisconsin-Madison — A Taylor-Dean flow profile is implemented on the upgraded Plasma Couette Experiment (PCX) aimed at exciting the magnetorotational instability (MRI). Taylor-Dean flow profiles are set up by injecting torque via a radial current crossing an axial magnetic field. A "virtual cathode" is set up in the center of PCX by applying a bias from a cathode located at the top center of the vessel to an anode at the bottom. This circuit is biased with respect to anodes at the outer wall to drive a radial current. A small vertical magnetic field is then applied via external Helmholtz coils in order to induce a $\mathbf{J} \times \mathbf{B}$ torque. Theoretical investigations have shown that the ion-neutral drag in PCX plasmas with low ionization fractions negatively affect the MRI threshold and growth rate. In order to increase the ionization fraction in PCX, upgrades to the multicusp magnet system and microwave power are underway. New SmCo magnets, like those used on the Madison Plasma Dynamo Experiment (MPDX), will provide better confinement and tolerate higher plasma temperatures than the previous ceramic ones. A MRI stability analysis of Taylor-Dean flows under relevant PCX parameters as well as early flow data will be presented.

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