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Prototype Plasma Dynamo Experiments DAVID WEISBERG, CARY FOREST, CAMI COLLINS, NOAM KATZ, IVAN KHALZOV, JOHN WALLACE, MIKE CLARK, University of Wisconsin - Madison — The Madison Plasma Dynamo Experiment (MPDX) is under construction to explore the self-excitation processes of a range of astrophysical dynamos. NIMROD simulations of von Kármán flow, in which the upper and lower hemispheres of the plasma are spun in opposite directions, have shown that the resulting two vortex flow can produce a dynamo when the magnetic Reynolds number is sufficiently high. This poster discusses prototype experiments on the Plasma Couette Experiment (PCX) to create von Kármán flow. The PCX (like the MPDX) uses an axisymmetric multicusp plasma confinement scheme that works in tandem with electrodes of alternating bias to create flow at the plasma boundary via ExB drift. This poster will review the theory with an emphasis on requirements on the plasma parameters and then show that the measured plasma parameters ($n_e \approx 10^{17} \text{ m}^{-3}$, $T_e \sim 10 \text{ eV}$) and flow speeds of 10 km/sec are high enough to self-excite, but are in a regime in which Hall MHD will likely be important. Higher densities (possible with higher power LaB6 cathodes) will be required to operate in the MHD regime. Work supported by NSF.

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