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Convective Instability in the Plasma Couette Experiment NOAM KATZ, CAMI COLLINS, DAVE WEISBERG, BEN BROWN, JOHN WALLACE, MIKE CLARK, CARY FOREST, U. Wisconsin, Madison — The emergence of flux from the tachocline and through the sun's surface is thought to occur by the magnetic buoyancy instability (Parker instability). The Plasma Couette Experiment (PCX) at U. Wisconsin-Madison presents a unique opportunity to explore this instability, as well as an instability due to compositional buoyancy, in the laboratory. In PCX, a cylindrical, axisymmetric plasma is confined in a ring cusp magnetic field, and rotated using ring electrodes, positioned between the magnets, which provide an ExB drift at the plasma boundary. Initial plasmas are characterized by densities of 10^{10} cm^{-3}, temperatures of 10 eV, and rotation velocities of 3 km/s. The rotation, as recorded by Mach probes, appears to be modulated by diamagnetic flows at the boundary. To achieve buoyant instability, we plan to inject either a light ion species (helium into a spinning argon plasma) or a small spheromak at the rotating boundary. Progress towards these goals will be discussed. Work supported by NSF and DOE (CMTFO).

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