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Optical Emission Spectroscopy in an Unmagnetized Flowing Plasma[1] BLAIR SEIDLITZ, CAMI COLLINS, MARK NORNBERG, JOHN BOFFARD, CARY FOREST, University of Wisconsin - Madison — Recently, a new technique has been developed to create a large, weakly magnetized, fast flowing, and hot plasma in the laboratory. These unique conditions make it possible to study a wide variety of phenomena in plasma astrophysics which is the goal of the Plasma Couette Experiment. Accurate measurements of plasma properties such as density and temperature have been challenging with Langmuir probes due to contamination, their perturbative nature, and the flowing plasma. To achieve a non-invasive measurement of relevant parameters, Optical Emission Spectroscopy techniques have been implemented using a low resolution ($\sim$1.5nm) fiber-coupled broad wavelength spectrograph. Argon line ratios were used to determine the metastable ArI densities through radiation trapping and electron temperature was deduced from the energy dependence of many optical emission cross sections. Time resolved measurements and radial profiles of temperature have been produced and have shown good agreement with triple probe results in the 2-6eV range. We are expanding these techniques to measurements of the electron density (using quenching of certain transitions), multispecies ion densities and further exploration of higher temperature regions all utilizing spectra from the above mentioned spectrograph, fully exploiting its wide wavelength range.

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