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Experimental Characterization of Azimuthal Velocity with Varying Reynolds Numbers in short Taylor-Couette Flow CYPRIAN CZARNOCKI, California State University San Marcos, PETER HUMANIK, Bergen County Academies, AUSTIN ROACH, MARK NORNBERG, ERIK SPENCE, Princeton Plasma Physics Laboratory, MICHAEL BURIN, California State University San Marcos, HANTAO JI, Princeton Plasma Physics Laboratory — Simulations of Taylor-Couette flow are difficult to reconcile with experimental measurements since the available Reynolds number of the simulations is normally much smaller than in most experiments. The ability to increase fluid viscosity by adding glycerol to water will allow for experiments to be run with a lower Reynolds number, allowing for the experimental results to be compared with simulations. In this experiment a Laser Doppler Velocimeter (LDV) is used to measure internal flow velocity within a short Taylor-Couette apparatus. The azimuthal velocity profiles are measured over a range of radial and axial positions with varying fluid viscosities. A comparison of both simulation and experimental results of azimuthal velocity profiles is presented. The goal for this experiment is to achieve good agreement between the experimental and simulation results and to help better understand the Ekman circulation and its suppression in the Princeton Magnetorotational Instability (MRI) Experiment.

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