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Flow Measurement and Three Dimensional Structure Modeling of Short Taylor-Couette Flow PETER HUMANIK, Bergen County Academies, ERIC EDLUND, ERIK SPENCE, AUSTIN ROACH, HANTAO JI, Princeton Plasma Physics Lab — Rotating fluid flows are of particular interest in many areas of science and engineering. Many devices involving the pumping of fluids, even in the field of medicine (Waluga 2008), involve Taylor-Couette flows or flows of similar schemes. The understanding of these flows is also of interest in modeling rotating fluids on a large scale, such as currents beneath the earth's crust and accretion disks in astrophysical systems. This experiment examines the characteristics of the waves formed by the flow of a short Taylor-Couette apparatus setup with a free surface. These waves include a peculiar wave formed along the inner cylinder producing a drastic radial asymmetry. The conditions of outer and inner cylinder speed necessary for this asymmetry to present itself are studied. This experiment also examines the shape of the free surface, a novel aspect of the flow rarely measured. Additionally, the velocity of the flow within the fluid is measured using laser Doppler velocimetry.

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