

Abstract Submitted
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A Stereo-PIV Study of the Taylor-Column Generated by a Rotating Disk JOZEF H.A. VLASKAMP, PETER J. THOMAS, University of Warwick, RAINER HOLLERBACH, University of Leeds, ROBERT M. KERR, University of Warwick — The formation of Taylor-Columns is one of the familiar phenomena observed in flows where strong background rotation is present. The current investigation considers the Taylor-Column generated by a rotating disc in a rotating fluid, a geometry similar to the classic Stewartson-layer problem. Experimental work is performed on the large turntable at the University of Warwick (overall height 5.7m and 1.4m diameter). The facility offers a water depth of 2m below the disk, allowing for a much longer Taylor-Column to be observed than in previous experimental work. A fully automated, traverse-mounted Stereo-PIV system has been developed to visualize the flow, allowing data-acquisition at different heights of the Taylor-Column without the need for recalibration. The experimental results show a z-dependence of the angular velocity profile in the Taylor-Column, which contradicts the Taylor-Proudman theorem. Additional numerical simulation is being performed and compared with the experimental results.

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