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**Taylor-Columns in Deep Water: Testing the Limits of the Taylor-Proudman Theorem** 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 differentially rotating disk in a rotating fluid, a geometry similar to the classic Stewartson-layer problem. Experimental work was performed on the large turntable at the University of Warwick (overall height 5.7m and 1.4m diameter). It offers a water depth of 2m below the disk, allowing for a much longer Taylor-Column to be observed than in previous experimental studies. An automated, traversing Stereo-PIV system was developed to visualize the flow, allowing data-acquisition at different heights in the tank. The experimental results show a z-dependence of the angular velocity in the interior of the Taylor-Column for positive differential rotation, but not for negative differential rotation. These results contradict both the Taylor-Proudman theorem and numerical predictions.

Jozef H. A. Vlaskamp  
University of Warwick

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