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**Probing the three-dimensional structure of a rotating turbulent flow**[1] JORI E. RUPPERT-FELSOT, University of Tokyo, HEPENG ZHANG, HARRY L. SWINNEY, University of Texas at Austin — We study laboratory produced fluid turbulence under the influence of rapid rotation. Three-dimensional turbulence was generated by strong pumping through sources and sinks at the bottom of a deep rotating tank (48.4 cm high, 39.4 cm diameter) filled with water. The resulting flow evolved toward quasi-two-dimensional (quasi-2D) turbulence with increasing height in the tank. The quasi-2D flow near the top of the tank contained many long-lived coherent vortices and jets[2]. Digital particle image velocimetry measurements of the flow field were made using tracer particles illuminated by laser light-sheets. Measurements using two synchronized cameras and vertically separated horizontal light-sheets revealed that the coherent vortices were columnar and vertically extended throughout the tank. We found the simultaneously measured vertically separated horizontal projections of the velocity field to be well correlated even at moderate rotation. Further, a gradual spatial decay was observed in the correlation for increasing vertical separation, rather than a sharp transition. The findings were consistent with the effect of rotation to cause a quasi-2D column-like flow structure aligned along the axis of rotation.

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[2]J. E. Ruppert- Felsot, O. Praud, E. Sharon, and H. L. Swinney, Phys. Rev. E **72**, 016311 (2005)

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