

Abstract Submitted
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Rotating spin-up in three dimensions JIN-QIANG ZHONG, Yale University, MICHAEL PATTERSON, Yale University & University of Bath, UK, JOHN WETTLAUFER, Yale University — Motivated by previous studies we revisit the well known transient spin up problem, with and without buoyancy forcing, using a new experimental technique. In so doing, we are able to examine the fluids behavior by extracting a series of two-dimensional velocity fields at multiple levels simultaneously thereby producing a three-dimensional view of the evolving flow. The results provide startling detail of the rich three dimensional structure of the flow, and reveal, amongst other things, depth dependent axisymmetric pattern formation and breakdown. Vertical slices of the velocity field reveal highly localized up and down-wellings. Our quantitative probing produces continuous velocity fields amenable to direct comparison with simulations.

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