

Abstract Submitted
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DNS and PIV investigation of nonlinear instability in a precessing cylinder flow¹ HUGH BLACKBURN, THOMAS ALBRECHT, Monash University, RICHARD MANASSEH, Swinburne University of Technology, JUAN LOPEZ, Arizona State University, PATRICE MEUNIER, IRPHE, CNRS — Direct numerical simulation results for flow inside a spinning, precessing cylinder of fluid corresponding to a previous experimental study and its extensions are presented and analysed in relation to experimental results and weakly nonlinear theory based on triad interaction of inviscid Kelvin modes. Simulation outcomes agree well with the experimental results both qualitatively and quantitatively, and additional processing reveals more in-depth support for the weakly nonlinear theory than could be demonstrated in the experiments. Additionally, numerical results provide meridional and azimuthal mean flow data.

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