Abstract Submitted
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Structure and stability of a round jet exiting a rotating pipe at moderate Reynolds numbers[1] C. DEL PINO, J. ORTEGA-CASANOVA, R. FERNANDEZ-FERIA, University of Malaga (Spain), E. SANMIGUEL-ROJAS, Polytechnic University of Cartagena (Spain) — The three-dimensional (3D) structure of a jet of water coming out of a rotating circular pipe into a quiescent tank of water is analyzed both experimentally (through LDA and PIV techniques), and numerically, for several values of the Reynolds number (Re) of the order of a few hundreds, and for several values of the swirl parameter (L). The observed 3D structure are discussed in the light of a spatial stability analysis of the corresponding axisymmetric jet for the same values of Re and L. Good agreement between the experimental measurements and the 3D numerical simulations, and between these and the structures predicted by the stability analysis for the most unstable waves, is found. Helical travelling waves with azimuthal wave number $|n| = 1$ are the first to be detected in the swirless jet as Re is increased, and in the swirling jet for a given Re as L is increased.

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