Abstract Submitted
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Formation number for vortex dipoles[1] VAHID SADRI, PAUL S KRUEGER, SMU — This investigation considers the axisymmetric formation of two opposite sign concentric vortex rings from jet ejection between concentric cylinders. This arrangement is similar to planar flow in that the vortex rings will travel together when the gap between the cylinders is small, similar to a vortex dipole, but it has the advantage that the vortex motion is less constrained than the planar case (vortex stretching and vortex line curvature is allowed). The flow was simulated numerically at a jet Reynolds number of 1,000 (based on ΔR and the jet velocity), jet pulse length-to-gap ratio ($L/\Delta R$) in the range 10–20, and gap-to-outer radius ratio ($\Delta R/R_o$) in the range 0.01-0.1. Small gap ratios were chosen for comparison with 2D results. In contrast with 2D results, the closely paired vortices in this study exhibited pinch-off from the generating flow and finite formation numbers. The more complex flow evolution afforded by the axisymmetric model and its influence on the pinch-off process will be discussed.

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