

Abstract Submitted
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Decay of vortex rings in spheroidal confined domains¹ MILAD SAMAEI, ARVIND SANTHANAKRISHNAN, Oklahoma State University — Recent studies studied the decay of vortex rings in radially confined domains; however, the vortex ring decay process in spheroidal confinement (axial and longitudinal confinement) remains unclear. This type of confinement is observed in the vortex rings formed during filling of the human cardiac left ventricle. We hypothesized that the rate of circulation decay increases in more axially confined domains. A piston-cylinder setup was used to generate vortex rings for this study. 2D time-resolved PIV was used to quantify the flow fields within three different aspect ratios of spheroidal silicone models (0.8, 1, and 1.25) under different filling duration, Reynolds number, and deceleration time. The formation number and peak circulation remained unaffected regardless of model shape. However, for the cases with the same filling duration, the vortex ring pinched-off earlier by shortening the acceleration time. We observed a higher rate of decay for the model with a lower aspect ratio (more axially confined).

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