

Abstract Submitted  
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**An experimental study on the formation of negatively-buoyant vortex rings** JEFF X. WU, GARY R. HUNT, Univ of Cambridge — Experiments to examine the formation of dense saline vortex rings projected vertically upwards into a quiescent freshwater environment were conducted. The setup was designed to dispense a cylindrical column of source fluid with aspect ratio  $L/D$  (the length  $L$  of dispensed saline column to the nozzle diameter  $D$ ) over a pre-set time interval. In an effort to execute an impulsive start and finish, a controlled flow circulation driven by a gear pump was developed to approximate a top-hat profile of source exit velocity versus time. Our measurements focus on describing the evolving morphology of the vortex rings with time and with source conditions ( $L/D$  and source Froude number). Our results reveal distinct formation regimes and our estimates of time required for formation as a function of density difference confirm predictions from previously published numerical simulations. The volume-based approach we adopt provides potentially a new angle for investigating the physics of these flows.

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