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Vortex breakdown of a co-flowing swirling jet with density difference under normal and inverted gravity fields SHUNSUKE TSUTSUMI, Ritsumeikan University, ADZLAN AHMAD, University of Malaysia Sarawak, HIROSHI GOTODA, Ritsumeikan University — We study vortex breakdown (VB) of a co-flowing swirling jet with a density difference under normal and inverted gravity fields. The density difference is created by issuing CO2 from an inner tube into ambient air. The formation region of unstable VB for a CO2 jet is larger under inverted gravity than under normal gravity. The trends of the changes in the stagnation point height are given particular attention while investigating the stable breakdown region. A physical model derived by considering the momentum balance in the flow is adopted to reasonably interpret the decrease in the stagnation point height of stable VB under inverted gravity with increasing inner swirl number of the inner jet, or the increase in the stagnation point height with increasing bulk flow velocity of the outer jet, for a swirling jet with a density difference.

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