

Abstract Submitted
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Three-dimensional simulations of burning thermals ANDY ASPDEN, JOHN BELL, Lawrence Berkeley National Lab, STAN WOOSLEY, UC Santa Cruz — Flame ignition in type Ia supernovae (SNe Ia) leads to isolated bubbles of burning buoyant fluid. As a bubble rises due to gravity, it becomes deformed by shear instabilities and transitions to a turbulent buoyant vortex ring. Morton, Taylor and Turner (1956) introduced the entrainment assumption, which can be applied to inert thermals. In this study, we use the entrainment assumption, suitably modified to account for burning, to predict the late-time asymptotic behaviour of these turbulent buoyant vortex rings in SNe Ia. The theory is validated against three-dimensional simulations with adaptive mesh refinement at effective resolutions up to 4096^3 .

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