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Bubbles from an Underwater Nozzle: Scaling and Memory at Pinch-Off NATHAN C. KEIM, WENDY W. ZHANG, SIDNEY R. NAGEL, James Franck Institute, University of Chicago, Chicago, IL 60637 — The pinch-off of air bubbles underwater is a non-universal singularity that retains a memory of nozzle shape and size.[1] Using high-speed video, we have studied the evolution of the pinching neck of air, with both water and ethanol as outer fluids in order to examine the role of surface tension. We find that while the scaling exponent of the radial length scale is independent of nozzle size, its axial scaling has an exponent that varies significantly with nozzle diameter. We have also systematically studied how the cylindrical asymmetry of initial conditions (*e.g.* nozzle tilt angle) is remembered at pinch-off, as measured by the number and size of satellite bubbles, and the distortion of the singular neck shape.

[1]N.C. Keim, P. Møller, W.W. Zhang, S.R. Nagel. arXiv:cond-mat/0605669 (2006)

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