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Shape instability of a collapsing bubble ARPIT TIWARI, CARLOS PANTANO, JONATHAN B. FREUND, University of Illinois at Urbana–Champaign — A low pressure gas or vapor spherical bubble becomes aspherical during the final stages of the collapse owing to its inherent dynamical instability. We study the nonlinear dynamics of compressible bubble collapses simulated with a three-dimensional HLLC based Riemann solver on an adaptively refined Cartesian mesh. A new interface capturing algorithm is used to preserve the integrity of the Eulerian representation of the gas-liquid interface. The gas is air, which is assumed to be ideal, and the surrounding liquid is water, which is modeled by a stiffened equation of state. Departure from the spherically symmetric Gilmore/Keller–Miksis model is quantified via spherical harmonic spectra of the surface shape. Broadening, and redistribution, of the initial modes as a function of time is observed during the collapse. Simulation results indicate that unexpected care is require to avoid spurious excitation of modes by the far-field boundaries of the computational domain.

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