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Compressibility Effects for Spherical Bubble Collapse in Water ROY BATY, SCOTT RAMSEY, CORY AHRENS, JASON ALBRIGHT, Los Alamos National Laboratory — This presentation outlines the derivation and solution of a potential flow equation used to model the effect of compressibility on bubble collapse in water. An unsteady potential flow equation is developed by adding a perturbation term to a classical incompressible flow solution describing the radial motion of a spherical bubble as a function of time. The flow is assumed to be one-dimensional and inviscid. Both linear and nonlinear forms of the compressible potential equation are presented assuming a general isentropic equation of state for water. The linear compressible potential flow equation is obtained by linearizing the perturbation term about the incompressible collapsing flow field. The linear and nonlinear compressible potential flow equations are integrated numerically for an analytical equation of state approximating water in the kilobar pressure range.

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