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Shear stresses and temperatures during the collapse of a bubble near a rigid wall[1] SHAHABODDIN ALAHYARI BEIG, ERIC JOHNSEN, Department of Mechanical Engineering, University of Michigan, Ann Arbor, United states — The collapse of a cavitation bubble is the central problem in cavitation erosion. In naval and biomedical applications, this process is known to lead to structural damage, whether intended or not. In the present work, the collapse of an initially spherical bubble, filled with non-condensable gas, near a rigid wall is simulated numerically using a high-order shock- and interface-capturing scheme. This computational approach prevents both temperature and pressure errors by using appropriate transport equations for the variables entering the equation of state. By directly solving the axisymmetric compressible Navier-Stokes equations, the viscous stresses and temperatures produced along the neighboring wall are computed. The quantities are critical when considering compliant bodies and polymeric coatings on metallic surfaces. The simulations show that substantial increases in temperature in the liquid may be produced. Characterization of the temperatures and viscous stresses along the neighboring wall will be presented.

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