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Bubble Motion in a Vibrating Liquid T.J. O'HERN, B. SHELDEN, J.R. TORCZYNSKI, Sandia National Laboratories — Gas bubbles can be forced to move downward, overcoming the buoyancy force, by vertical vibration of the liquid containing the bubble. Bubble motion is controlled by interactions of the oscillating pressure field, and the corresponding bubble volume, with the drag force acting on the bubble. The bubble-drag asymmetry and the oscillating pressure gradient can combine to produce net bubble motion. This is analogous to the Bjerknes force in high-frequency vibrations. Experiments have been conducted demonstrating downward bubble motion over a range of vibration conditions (all less than 300 Hz), liquid properties, and pressure in the air above the free surface. Bubble size and velocity were measured using automated image-processing routines. Comparisons with theory and simulations will be shown. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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