Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Quantitative Measurement of Bubble Bifurcation in a Vibrated, Enclosed Cylinder Using High-Speed Imaging DAYNA OBENAUF, BENJAMIN HALLS, JOHN TORCZYNSKI, Sandia National Laboratories — When an enclosed cylinder partially filled with viscous liquid is exposed to certain vibration conditions, the gas bubble normally contained in the upper region will undergo breakup. Bubbles entrained within the liquid will migrate downward due to Bjerknes forces. Within a range of conditions, bubbles will sink to a specific depth that is a function of the vibration conditions and rapidly accelerate to the bottom if this depth is exceeded. Bubbles remaining steady at the bottom of the cylinder can coalesce, so that the gas occupying the cylinder bifurcates into two separate regions encasing the liquid. High-speed visible-light imaging is used to characterize the resulting bubble size and velocity distributions as the bubbles migrate to the bottom of the cylinder. The parameters investigated include oscillation frequency and initial gas volume fraction in the cylinder. SNL is managed and operated by NTESS under DOE NNSA contract DE-NA0003525. SAND2020-7749 A

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Date submitted: 29 Jul 2020 Electronic form version 1.4