Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

A Discrete Element Method for Rectified Bubble Motion MARK FERRARO, TIMOTHY KOEHLER, SCOTT ROBERTS, JOHN TORCZYNSKI, Sandia National Laboratories — A bubble in a vibrating liquid-filled housing experiences a Bjerknes force that can create a net (rectified) downward motion of the bubble against gravity. Here, we consider a simplified discrete element method which treats each bubble as a compressible, spherical particle with a diameter determined by the local pressure. The Bjerknes force is computed from the oscillating pressure field. Bubble motion is determined from the balance of the Bjerknes, buoyancy, and drag forces (here, Stokes' Law). We show results of both single-bubble and multi-bubble simulations for various frequencies, forcing amplitudes, bubble size distributions, and gas volume fractions. Sandia National Laboratories is a multi-mission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525. This paper describes objective technical results and analysis. Any subjective views or opinions that might be expressed in the paper do not necessarily represent the views of the U.S. Department of Energy or the United States Government.

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Date submitted: 05 Aug 2020 Electronic form version 1.4