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Theoretical and Experimental Investigation of Particle Trapping via Acoustic Bubbles YUN CHEN, Texas A&M University, ZECONG FANG, BRETT MERRITT, DARIUS SAADAT-MOGHADDAM, Washington State University Vancouver, DILLON STRACK, Texas A&M University, JIE XU, University of Illinois at Chicago, SUNGYON LEE, Texas A&M University — One important application of lab-on-a-chip devices is the trapping and sorting of micro-objects, with acoustic bubbles emerging as an effective, non-contact method. Acoustically actuated bubbles are known to exert a secondary radiation force on micro-particles and trap them, when this radiation force exceeds the drag force that acts to keep the particles in motion. In this study, we theoretically evaluate the magnitudes of these two forces for varying actuation frequencies and voltages. In particular, the secondary radiation force is calculated directly from bubble oscillation shapes that have been experimentally measured for varying acoustic parameters. Finally, based on the force estimates, we predict the threshold voltage and frequency for trapping and compare them to the experimental results.

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