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Single Bubble Collapse at Audible Frequencies and High Amplitudes[1] DAVIDE MASIELLO, IGNACIO TUDELA-MONTES, The University of Edinburgh, RAMA GOVINDARAJAN, International Centre for Theoretical Sciences, RAJARAM NITYANANDA, Azim Premji University, PRASHANT VALLURI, The University of Edinburgh — While the characteristics of bubbles' radial motion have been widely studied for driving frequencies higher than 20 kHz, lower frequency ranges remain unexplored. In this work, dynamics of an acoustically forced gas/vapor single micro-bubble in water have been studied for driving frequencies below 20 kHz by means of a reduced-order model accounting for all the critical thermo-mechanical contributions. Our investigations in a large parameter space (frequency x amplitude =[1-100 kHz] x [1-7.5 atm]) suggest that at low frequencies and/or high amplitudes, water phase-change and vapor segregation play a key role in slowing down the dynamics, yielding a remarkably different behavior where the first collapse is not necessarily the strongest one (which is the case for higher frequencies). However, at moderate amplitudes (1-1.1 atm), low frequency forcing yields bubble dynamics comparable to the high-frequency/high-amplitude cases.

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