Abstract Submitted
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Dynamics of bubble collapse under vessel confinement in 2D hydrodynamic experiments[1] GALINA SHPUNTOVA, JOANNA AUSTIN, University of Illinois at Urbana-Champaign — One trauma mechanism in biomedical treatment techniques based on the application of cumulative pressure pulses generated either externally (as in shock-wave lithotripsy) or internally (by laser-induced plasma) is the collapse of voids. However, prediction of void-collapse driven tissue damage is a challenging problem, involving complex and dynamic thermomechanical processes in a heterogeneous material. We carry out a series of model experiments to investigate the hydrodynamic processes of voids collapsing under dynamic loading in configurations designed to model cavitation with vessel confinement. The baseline case of void collapse near a single interface is also examined. Thin sheets of tissue-surrogate polymer materials with varying acoustic impedance are used to create one or two parallel material interfaces near the void. Shadowgraph photography and two-color, single-frame particle image velocimetry quantify bubble collapse dynamics including jetting, interface dynamics and penetration, and the response of the surrounding material.

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Galina Shpuntova
University of Illinois at Urbana-Champaign

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