

Abstract Submitted
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Numerical investigations of cavitation-induced tissue damage¹

LAUREN MANCIA, University of Michigan, MAURO RODRIGUEZ, California Institute of Technology, JONATHAN SUKOVICH, University of Michigan, SELDA BUYUKOZTURK, Brown University, CHRISTIAN FRANCK, University of Wisconsin, ZHEN XU, ERIC JOHNSEN, University of Michigan — Cavitation is known to damage tissue in blast injuries and ultrasound procedures. The mechanisms for cavitation-induced damage to soft matter are still poorly understood, and a basic modeling framework is needed to guide future experiments and to efficiently model bubble clouds. This presentation introduces a bubble dynamics model that has been validated using single-bubble radius vs. time data obtained from ultrasound and laser experiments. The model is then used to infer experimentally uncertain quantities such as nucleus size and thermodynamic conditions at the onset of bubble growth. Finally, potential cavitation damage mechanisms are introduced and used to propose a strain-based cavitation damage metric.

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