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Nonlinear dynamics of PLA (poly-lactic acid) encapsulated ultrasound contrast microbubbles[1] SHIRSHENDU PAUL, University of Delaware, KAUSIK SARKAR, George Washington University, MARGARET WHEATLEY, Drexel University — The presence of the stabilizing encapsulation in microbubble based ultrasound contrast agents (UCAs) has critical effects on their acoustic properties. Biodegradable polymers like poly-lactic acid (PLA) hold promises to provide better stability and control over properties. Here, we report determination of interfacial rheological properties of PLA microbubbles using *in vitro* experiments and investigation of their non-linear scattering response. The average bubble size measured using DLS is 1.8 μm. However, the attenuation measured through a suspension of PLA bubbles shows a peak between 2.5-3.2 MHz, much smaller than the resonance frequency of a free bubble of similar size. This observation is explained by an extremely low surface elasticity (0.02-0.06 N/m) and the polydispersity of the bubble population. The estimated properties lead to an excellent agreement between model prediction and the experimentally measured response (up to 30 dB enhancement of fundamental response). Subharmonic threshold prediction is shown to be critically dependent on the bubble size distribution.

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Kausik Sarkar
George Washington University

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