Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

**The effect of relaxation on cavitation dynamics in viscoelastic media**[1] LAUREN MANCIA, MATTHEW WARNEZ, ERIC JOHNSEN, University of Michigan — Cavitation plays an important role in diagnostic and therapeutic ultrasound. In certain applications, cavitation bubbles are produced directly in soft tissue, a viscoelastic medium. Although bubble dynamics research in water has received significant attention, the behavior of bubbles in tissue-like media is much less well understood, as the dynamics are strongly affected by the viscoelastic properties of the surroundings, including viscosity, elasticity and relaxation. In the present work, we numerically investigate the role of stress relaxation on spherical bubble dynamics. We simulate bubble dynamics in viscoelastic media with linear and nonlinear relaxation under different types of forcing. Results indicate that the presence of relaxation causes faster growth rates and permits bubble rebound driven purely by residual stresses in the surroundings, a phenomenon not observed in Newtonian media. Differences between nonlinear models become important only following a strong collapse (in which high stresses are generated), thus requiring a robust numerical approach.

[1]This work was supported by NSF grant number CBET 1253157 and NIH grant number 1R01HL110990-01A1.

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Date submitted: 01 Aug 2014 Electronic form version 1.4