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Characterization of High Q Spherical Resonator KENNETH BADER, University of Mississippi, JASON RAYMOND, University of Mississippi, National Center for Physical Acousitcs, JOEL MOBLEY, University of Mississippi, National Center for Physical Acoustics, FELIPE GAITAN, ROSS TESSIEN, ROBERT HILLER, Impulse Devices, Inc., NATIONAL CENTER FOR PHYSICAL ACOUSTICS, UNIVERSITY OF MISSISSIPPI TEAM, IMPULSE DEVICES, INC. TEAM — This paper describes the vibrational dynamics of a spherical acoustical resonator system used in the study of acoustic cavitation phenomena in liquids as part of an effort to scale up the energy density of collapse of transient cavitation. The system consists of a stainless steel shell (10" OD and 0.5" thick) filled with degassed water that exhibits several high Q (>10 000) modes in the 20-40 kHz range, and which is driven by an external horn-type transducer. This paper will focus on the characterization of the vibrational spectrum of the resonator as well as the radial variations of the pressure fields in the liquid internal to the shell. The vibrations of the shell surface are monitored using an attached ultrasonic transducer as well as a laser Doppler vibrometer. The internal pressure fields of the sphere are mapped using needle type hydrophones. The vibrational spectrum will be compared with theoretical predictions for moderately thick shell resonators developed by Mehl (JASA 78(2), 1985, pp. 782-788).

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