Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

The Generation of Pressure Waves by the Implosion of Light Bulbs in a High-Pressure Water Environment[1] C. IKEDA, University of Maryland, M. CZECHANOWSKI, Mannheim University, J.H. DUNCAN, University of Maryland — The implosion of light bulbs in a high-pressure water environment was studied experimentally in a nearly spherical implosion tank with a nominal internal diameter of 1.77 m. During an experimental run, the light bulb was tethered in the center of the tank which was then filled with water and slowly pressurized by adding nitrogen gas into a small ullage above the water. The gas pressure in the ullage was measured with a slow response transducer and the high-frequency pressure waves in the water were recorded at 14 positions in the tank with underwater blast sensors. The motion of the light bulb was recorded with a high-speed digital movie camera. The implosions occurred at ambient pressures (P_a) ranging from 6.1 bar to 11.6 bar. The collapse times of the light bulbs were found to be about 1.3 times the theoretical collapse time of a spherical bubble at the same ambient pressure and with the same radius as the light bulb. The ratio of the peak pressure increase due to the pressure wave at a fixed distance (r) from the bubble to the ambient pressure at implosion ($(P(r) - P_a)/P_a$) increased from about 0.5 to 2.7 as the ambient pressure increased over the above-mentioned range.

[1]Supported by the Office of Naval Research.

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Date submitted: 03 Aug 2007 Electronic form version 1.4