Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Underwater shock focusing by composite structures[1] CHUANXI WANG, University of Southern Califronia, VERONICA ELIASSON, University of Southern California — Underwater explosions are threats to the structural integrity of naval vessels. In particular, if a convergent section is present on the vessel, the shock wave can focus and produce extremely high pressures near the focal region. Based on previous research on converging shock waves, a logarithmic spiral duct is considered to be an efficient shape to focus shock waves onto the focal region. Here, underwater shock tests on logarithmic spiral-shaped structures made of plastic, metal and fiber composites are conducted. High-speed schlieren photography is used to visualize the shock waves. Simultaneously, ultrafast pressure readings are recorded by laboratory- made pressure sensors, which are able to measure pressures up to 10 GPa. Comparisons between the various types of surrounding materials will be presented. The results can explore the use of composite materials in future marine applications.

[1]Supported by ONR through a MURI grant number N00014-06-1-0730.

Chuanxi Wang
University of Southern Califronia

Date submitted: 04 Aug 2011 Electronic form version 1.4