Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Numerical Study of Shock Wave Attenuation Using Logarithmic Spiral Liquid Sheet. QIAN WAN, University of Southern California, RALF DEITERDING, University of Southampton, VERONICA ELIASSON, University of California, San Diego — Research of shock wave attenuation has drawn much attention due to its military and civilian applications. One method to attenuate shock waves is to use water to block the shock wave propagation path and allow the shock wave to lose energy by breaking up the water sheet. We propose a way by holding a water sheet in logarithmic spiral shape, which has the ability of focusing the incident shock wave to its focal region. In addition, the shock wave will break up the bulk water and thus lose energy. The process of shock wave reflecting off and transmitting through the water sheet is numerically modeled using Euler equations and stiffened gas equation of state. In this study, the shock focusing ability of a logarithmic spiral water sheet is compared for various logarithmic spiral sheets. Further, the attenuation effect is quantified by the measurement of pressure impulse and peak pressure behind the transmitted and reflected shock waves.

Qian Wan
University of Southern California

Date submitted: 01 Aug 2016 Electronic form version 1.4