Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

**Proton Acceleration from Shock Compressed Gaseous Target**[1]
MICHAEL HELLE, DANIEL GORDON, DMITRI KAGANOVICH, US Naval Research Laboratory, YU-HSIN CHEN, ANTHONY ZINGALE, RSI, Inc., ANTONIO TING, US Naval Research Laboratory — We will present experimental results of the acceleration of protons from a near critical density target produced by the collision of two strong shockwave fronts. The target is created by igniting optically driven, counter-propagating hydrodynamic shocks into the flow of a gas jet in vacuum. The colliding shockwaves produce a 50um thick hydrogen gas region with a peak density greater than quarter critical. Preliminary results show proton energies $\sim$ 2 MeV using the 10TW TFL laser system at NRL. 3D PIC simulations of this interaction yield comparable proton energies and show characteristics of Magnetic Vortex Acceleration. This mechanism takes advantage of an inductive accelerating field setup by the strong azimuthal magnetic field produced by electrons accelerating through the back of the target. Further experimental results examining various targets, laser parameters, and ion species will be discussed.

[1]This work is supported by the DoE, HEL-JTO and NRL Base Program

Michael Helle
US Naval Research Laboratory

Date submitted: 11 Jul 2014 Electronic form version 1.4