Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Production of Cumulative Jets Generated by Laser-Driven Collapsing Hollow Cones and Wedges[1] SERGEI NIKITIN, RSI Inc., Lanham, MD, JACOB GRUN, Naval Research Laboratory, CHARLES MANKA, RSI Inc., Lanham, MD, YEFIM AGLITSKIY, SAIC Inc., San Diego, CA, DANIEL ZABETAKIS, ALEXANDER VELIKOVICH, Naval Research Laboratory, CHRISTOPHER MILLER, RSI Inc., Lanham, MD, JOHN M. LAMING, Naval Research Laboratory, NAVAL RESEARCH LABORATORY COLLABORATION, RSI INC., LANHAM, MD COLLABORATION, SAIC INC., SAN DIEGO, CA COLLABORATION — Cumulative plasma jets formed by imploding hollow cones and wedges are observed. The cones, made from 4-10 mg/cm^{2}Ni or Al foils, with a base diameter of 500 μm and 90 - 130^o apex angles, are imploded by a 1.054-μm wavelength, $\sim$4 ns FWHM laser pulse focused to $\sim$ 2*10^{13} W/cm^2 on their outer surface. Jet shape, location, and densities are measured with monochromatic radiography utilizing 0.65 keV x-rays. For certain cone geometries, cumulative jets with ion densities $>10^{19}$ cm^{-3} propagate at velocities >10 km/sec. The interaction of such jets with an ambient medium and the resulting shock structures can be used for lab simulation of aspects of various astrophysical phenomena such as jets produced in supernovae explosions or accretion of plasma onto compact objects (black hole, neutron star or white dwarf).

[1]Supported by DOE.

Jacob Grun
NRL

Date submitted: 23 Jul 2006 Electronic form version 1.4