Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Monoenergetic ion beam production through the generation of ion solitary waves in relativistically transparent plasma with a high intensity circularly polarized laser[1] B.J. ALBRIGHT, L. YIN, D. JUNG, K.J. BOWERS, R. SHAH, S. PALANIYAPPAN, J.C. FERNÁNDEZ, B.M. HEGELICH, Los Alamos National Laboratory — Experiments at the LANL Trident user facility have yielded quasi-monoenergetic ion beams from the interaction of an ultraintense, circularly polarized laser with a solid density, nm-scale target under conditions of ultrahigh laser pulse contrast [1]. Kinetic modeling shows that after a brief radiation pressure acceleration phase, the plasma turns relativistically transparent and nonlinear ion density spikes propagate across the plasma in a manner that efficiently couples laser energy into ion kinetic energy [2]. Understanding the governing physics is possible with an application of analytic theory, shown to reproduce the features of these solitary waves. This theory will be discussed along with how to optimize energy and degree of monoenergeticity of this novel class of laser-generated ion beams.

[1] D. Jung et al. "Monoenergetic ion beam generation by driving ion solitary waves with circularly polarized light," Phys. Rev. Lett. (submitted).
[2] L. Yin et al., Phys. Plasmas 18, 053103 (2011).

[1]Work performed under the auspices of the U.S. Dept. of Energy and supported by the DOE OFES.

B. J. Albright
Los Alamos National Laboratory

Date submitted: 22 Jul 2011 Electronic form version 1.4