Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Advanced techniques in laser-ion acceleration: Conversion efficiency, beam distribution and energy scaling in the Break-Out Afterburner regime DANIEL JUNG, LIN YIN, BRIAN ALBRIGHT, DONALD GAUTIER, Los Alamos Natl. Lab., RAINER HOERLEIN, Max Planck Institute for Quantum Opticss , RANDALL JOHNSON, Los Alamos Natl. Lab., DANIEL KIEFER, University of Munich, SAM LETZRING, RAHUL SHAH, SASIKUMAR PALANIYAPPAN, TSUTOMU SHIMADA, Los Alamos Natl. Lab., DIETRICH HABS, University of Munich, JUAN FERNANDEZ, MANUEL HEGELICH, Los Alamos Natl. Lab. — Recently, increasing laser intensities and contrast made acceleration mechanisms such as the radiation pressure acceleration or the Break-Out Afterburner (BOA) accessible. These mechanisms efficiently couple laser energy into all target ion species, making them a competitive alternative to conventional accelerators. We here present experimental data addressing conversion efficiency and ion distribution scaling for both carbon C^{6+} and protons within the BOA regime and the transit into the TNSA regime. Unique high resolution measurements of angularly resolved carbon C^{6+} and proton energy spectra for targets ranging from 30nm to 25microns - recorded with a novel ion wide angle spectrometer - are presented and used to derive thickness scaling estimates. While the measured conversion efficiency for C^{6+} reaches up to $\sim$6%, peak energies of 1GeV and 120MeV have been measured for C^{6+} and protons, respectively.

Daniel Jung
Los Alamos Natl. Lab.

Date submitted: 18 Jul 2011 Electronic form version 1.4