Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

The impact of contaminants on laser-driven ion acceleration in the TNSA regime[1] GEORGE PETROV, Naval Research Laboratory, LOUISE WILLINGALE, University of Michigan, JACK DAVIS, TZVETELINA PETROVA, Naval Research Laboratory, ANATOLY MAKSIMCHUK, KARL KRUSHELNICK, University of Michigan — Acceleration of light ions (deuterium and carbon) in the Target Normal Sheath Acceleration regime is studied theoretically and experimentally in the presence of contaminants residing on the rear target surface. Experimental data from 6 μm thick aluminum foil coated with a 1 μm deuterated plastic (CD) layer on the back surface show that the protons of the contamination layer are preferentially accelerated, while the acceleration of deuterons is strongly suppressed. Two-dimensional particle-in-cell simulations are used to assess the role of contaminants and suggest a remedy to the problem. Laser fluence in excess of 1 J/μm^2 is required to overcome the contaminants problem and ensure efficient ion acceleration, while for laser fluence below 1 J/μm^2 the contamination layer over the CD surface inhibits the deuteron acceleration.

[1]This work was supported by the DoE/NNSA and NRL.

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Date submitted: 07 Jul 2010 Electronic form version 1.4