Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Target Optimization Stategies for Control Laser Driven Ion Acceleration BJOERN MANUEL HEGELICH, LANL, K.A. FLIPPO, BRIAN J. ALBRIGHT, LIN YIN, J. COBBLE, CORT GAUTIER, SAMUEL LETZRING, MARK PAFFET, ROLAND SCHULZE, JUAN C. FERNANDEZ, LANL — Laser-induced ion acceleration, until recently, has been poorly controlled. In this paper, we describe the results from our latest experiments aimed at increasing the control over the ion species, its charge state and its energy spectrum. Focusing a ∼30 TW laser pulse on a thin metal foil target, different ions, from Z=1 up to Z=78 have been accelerated to multi-MeV/nucleon energies. Using different target materials, and a better controlled heating technique, we performed detailed studies of the effects of target conditions on the properties of the accelerated ions. Depending on material and temperature, the dominantly accelerated species, its charge state and its energy spectrum can be changed. Using 2 Thomson parabolas at different angles simultaneously enables us to recover information on the spatial ion distribution for given laser and target conditions. The data obtained in the experiments will than be used to expand our predictive capability, from that embodied in our current 1D hybrid model of the ion acceleration, to a 2D and later a full 3D model.

Bjoern Manuel Hegelich
LANL

Date submitted: 29 Jul 2005 Electronic form version 1.4