Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Proton shock acceleration using a high contrast high intensity laser MAXENCE GAUTHIER, CHRISTIAN ROEDEL, JONGJIN KIM, SLAC Stanford Accelerator Laboratory, BASTIAN AURAND, Heinrich Heine Universität Düsseldorf, CHANDRA CURRY, SEBASTIAN GOEDE, ADRIENNE PROPP, SLAC Stanford Accelerator Laboratory, CLEMENT GOYON, ART PAK, Lawrence Livermore National Laboratory, SHAUN KERR, University of Alberta, BHUVANESH RAMAKRISHNA, Indian Institute of Science Education and Research, JOHN RUBY, JACKSON WILLIAM, Lawrence Livermore National Laboratory, SIEGFRIED GLENZER, SLAC Stanford Accelerator Laboratory — Laser-driven proton acceleration is a field of intense research due to the interesting characteristics of this novel particle source including high brightness, high maximum energy, high laminarity, and short duration. Although the ion beam characteristics are promising for many future applications, such as in the medical field or hybrid accelerators, the ion beam generated using TNSA, the acceleration mechanism commonly achieved, still need to be significantly improved. Several new alternative mechanisms have been proposed such as collisionless shock acceleration (CSA) in order to produce a mono-energetic ion beam favorable for those applications. We report the first results of an experiment performed with the TITAN laser system (JLF, LLNL) dedicated to the study of CSA using a high intensity (5×10^{19} W/cm^2) high contrast ps laser pulse focused on 55 μm thick CH and CD targets. We show that the proton spectrum generated during the interaction exhibits high-energy mono-energetic features along the laser axis, characteristic of a shock mechanism.

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Date submitted: 24 Jul 2015 Electronic form version 1.4