Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Laser-driven proton and deuteron acceleration from a pure solid-density H2/D2 cryogenic jet JONGJIN KIM, MAXENCE GAUTHIER, SLAC, BASTIAN AURAND, ILPP, CHANDRA CURRY, SEBASTIAN GOEDE, SLAC, CLEMENT GOYON, JACKSON WILLIAMS, LLNL, SHAUN KERR, University of Alberta, JOHN RUBY, Villanova University, ADRIENNE PROPP, Harvard University, BHUVANESH RAMAKRISHNA, IISER, ART PAK, ANDY HAZI, LLNL, SIEGFRIED GLENZER, CHRISTIAN ROEDEL, SLAC — Laser-driven proton acceleration has become of tremendous interest for the fundamental science and the potential applications in tumor therapy and proton radiography. We have developed a cryogenic liquid hydrogen jet, which can deliver a self-replenishing target of pure solid-density hydrogen or deuterium. This allows for a target compatible with high-repetition-rate experiments and results in a pure hydrogen plasma, facilitating comparison with simulations. A new modification has allowed for the formation of jets with rectangular profiles, facilitating comparison with foil targets. This jet was installed at the Titan laser and driven by laser pulses of 40-60 J of 527 nm laser light in 1 ps. The resulting proton and deuteron spectra were measured in multiple directions with Thomson parabola spectrometers and RCF stacks. The spectral and angular information suggest contribution from both the TNSA and RPA acceleration mechanisms.

Jongjin Kim
SLAC - Natl Accelerator Lab

Date submitted: 24 Jul 2015 Electronic form version 1.4