Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Hot deuteron generation and neutron production in deuterated nanowire array irradiated at relativistic intensity[1] ALDEN CURTIS, CHASE CALVI, Colorado State Univ, JIM TINSLEY, national security technologies, REED HOLLINGER, SHOUJUN WANG, ALEX ROCKWOOD, YONG WANG, CONRAD BUSS, VYACHESLAV SHLYAPTSEV, Colorado State Univ, V KAYMAK, ALEXANDER PUKHOV, University of Deusseldorf, JORGE ROCCA, Colorado State Univ — Irradiation of arrays of aligned high aspect ratio nanowires with high contrast femtosecond laser pulses of relativistic intensity was recently shown to volumetrically heat near solid density plasmas to multi-KeV energy [1]. Using aligned arrays of deuterated polyethylene nanowires (CD_2) irradiated at laser intensities of up to 1 x 10^{20} W/cm^2 we are able to generate near solid density plasmas in which the tail of the deuteron distribution was measured to reach energies of up to 3 MeV, in agreement with particle-in-cell simulations. Comparative measurements conducted using flat CD_2 targets irradiated by the same laser pulses show the maximum deuteron energies are sub-MeV. We also observed a 100x increase in the number of neutrons produced as compared to flat CD_2 targets irradiated at the same conditions, with the highest yield shots producing above 10^6 neutrons per Joule of laser energy. [1] M. A. Purvis, V. N. Shlyaptsev, R. Hollinger, C. Bargsten, A. Pukhov, A. Prieto, Y. Wang, B. Luther, L. Yin, S. Wang, and J. J. Rocca, Nature Photonics **7**, 769, (2013).

[1]Work supported by AFOSR award FA9560-14-10232 and NSTec SDRD program

Alden Curtis
Colorado State Univ

Date submitted: 15 Jul 2016 Electronic form version 1.4