Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Effect of Shaped High-intensity Short-Pulses on Particle Acceleration[1] DEREK MARISCAL, GRAEME SCOTT, Lawrence Livermore Natl Lab, RASPBERRY SIMPSON, Massachusetts Institute of Technology, ELIZABETH GRACE, Georgia Tech, JOOHWAN KIM, UC San Diego, BLAGOJE DJORDJEVIC, SCOTT WILKS, ANDREAS KEMP, Lawrence Livermore Natl Lab, JORGE ROCCA, REED HOLLINGER, SHOUJUN WANG, Colorado State University, TAMMY MA, Lawrence Livermore Natl Lab — While much of high-intensity short-pulse laser-driven particle acceleration experiments typically focus on increasing energy through increased intensity, only limited attention has been paid to the time-dependent intensity profile. Real short-pulses contain familiar structures such as pre-pulses and pedestals, however, the same laser technology used to make the primary pulse Gaussian-like can also be used to modify the temporal intensity profile. While research with multiple short-pulses has shown significant benefits to proton acceleration, this work extends this concept to more complex intensity profiles with proof-of-principle experiments. Techniques for generating multiple short pulses or shaping at the femtosecond level were used to drive MeV particle sources from solid targets at the CSU ALEPH facility. The effect of such pulses on electron and proton acceleration will be discussed with comparisons to new many-simulation techniques for exploring this vast parameter space and examining the time-dependent particle acceleration.

[1]U.S. Department of Energy by Lawrence Livermore National Laboratory under contract DE-AC52-07NA27344 with funding support from the Laboratory Directed Research and Development Program under tracking code 20-ERD-048, the DOE Office of Science Early Career Research Program under SCW1651

Derek Mariscal
Lawrence Livermore Natl Lab

Date submitted: 29 Jun 2020 Electronic form version 1.4