Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

**Characterization of Simulated High-Intensity Optical Vortices for Proton Target-Normal Sheath Acceleration** ELIZABETH GRACE, Georgia Institute of Technology, TAMMY MA, DEREK MARISCAL, Lawrence Livermore National Laboratory, RASPBERRY SIMPSON, Massachusetts Institute of Technology, GRAEME SCOTT, Lawrence Livermore National Laboratory, JOOHWAN KIM, University of California San Diego, MICHELLE RHODES, Lawrence Livermore National Laboratory, RICK TREBINO, Georgia Institute of Technology — High-intensity, short pulse lasers serve as phenomenal tools to produce high-brightness, high-energy laser-driven particle sources. Recent simulation results have shown that two pulses separated by a narrow spatial gap and relative temporal delay can produce an increase in the maximum proton energy from target normal sheath acceleration (TNSA) [1]. Earlier this year, off-axis spiral phase mirrors were used to generate high intensity optical vortices, which carry orbital angular momentum (OAM) and have annular spatial profiles and helical wave-fronts [2]. Taken together, these two findings suggest that optical vortices could be used to achieve higher maximum proton energies from TNSA. Motivated by these results, this work examines these annular optical pulses and simulates the characterization and retrieval of these pulses using a novel technique, Spatially and Temporally Resolved Intensity and Phase Evaluation Device: Full Information from a Single Hologram (STRIPED FISH). Based on these simulations, STRIPED FISH correctly retrieves optical vortices, and can be leveraged in HED experiments to provide deeper insight into laser plasma interactions.

Elizabeth Grace
Georgia Institute of Technology

Date submitted: 29 Jun 2020 Electronic form version 1.4