Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

An overview of Laser-Produced Relativistic Positrons in the Laboratory[1] BRANDON EDGHILL, Univ of California - San Diego, GERALD WILLIAMS, HUI CHEN, Lawrence Livermore National Laboratory, FARHAT BEG, Univ of California - San Diego — The production of relativistic positrons using ultraintense lasers can facilitate studies of fundamental pair plasma science in the relativistic regime and laboratory studies of scaled energetic astrophysical mechanisms such as gamma ray bursts. The positron densities and spatial scales required for these applications, however, are larger than current capabilities. Here, we present an overview of the experimental laser-produced positron results and their respective modeling for both the direct laser-irradiated process and the indirect process (laser wakefield accelerated electrons irradiating a high-Z converter). Conversion efficiency into positrons and positron beam characteristics are compared, including total pair yield, mean energy, angular divergence, and inferred pair density for various laser and target conditions. Prospects towards increasing positron densities and beam repetition rates will also be discussed.

[1]This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344, and funded by LDRD (17-ERD-010).

Brandon Edghill
Univ of California - San Diego

Date submitted: 13 Jul 2017 Electronic form version 1.4