

Abstract Submitted
for the FWS14 Meeting of
The American Physical Society

Positron Production Using a Laser-Wakefield Electron Source¹

JACKSON WILLIAMS, UC Davis, LLNL, FELICIE ALBERT, HUI CHEN, LLNL, JAEBUM PARK, UC Davis, LLNL, BRAD POLLOCK, LLNL — Positron generation using wakefield-accelerated electrons driven into a second mm-scale target was investigated using the Callisto Laser at the Jupiter Laser Facility at Lawrence Livermore National Laboratory. This technique [1] is in contrast to previous experiments that use direct laser-target interactions to create positron-electron pairs [2], and has the potential to make laser-produced positron sources widely available to smaller scale laboratories. Monte Carlo simulations show a collimated wakefield electron beam produces a positron beam with a significantly larger divergence angle (>100 mrad) due to multiple small angle coulomb scattering, resulting in an emitted pair density of 10^{13} particles/cm³. At the Callisto Laser, we did not observe a signal consistent with positrons.. This could be due to a high noise environment and a large detection threshold.

[1] G. Sarri et al., Phys. Rev. Lett., 110:255002, Jun 2013.

[2] H. Chen et al., Phys. Rev. Lett., 105:015003, Jul 2010.

¹This work was performed under the auspices of the U.S. Department of Energy (DOE) by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344 and funded by the LLNL LDRD program under tracking code 13-LW-076 and 12-ERD-062.

Jackson Williams
UC Davis, LLNL

Date submitted: 10 Oct 2014

Electronic form version 1.4