

Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Spectroscopy of positron annihilation gamma rays from laser-exited media¹ C.I. SZABO, U. FELDMAN, Artep Inc, J. SEELY, NRL, L. HUDSON, NIST, HUI CHEN, R. TOMMASINI, A. HAZI, R. SHEPHERD, LLNL, C. ZULICK, F. DOLLAR, U. Michigan, K. FALK, C.D. MURPHY, U. Oxford — Motivated by calculations for gamma ray yields and results of positron beam measurements from laser irradiated high Z targets [1], a Gamma-ray Crystal Spectrometer (GCS) was built by Artep Inc. and fielded at the Titan laser facility of LLNL. The spectrometer is equipped with heavy shielding around a cylindrically bent Ge crystal in a transmission geometry. The Bremsstrahlung continuum and the 511 keV annihilation gamma rays are dispersed by the Ge(440) crystal and detected by an image plate placed on the Rowland circle. The gamma rays originate inside the thick target material (1 to 3 mm Au disks) where positrons are produced in the intense field of the high energy (350 J) short pulse (10 ps) laser irradiation. In addition to the spectrometer, two different electronic detection systems also recorded the gamma ray spectra using the single hit per pixel technique. The first gamma ray spectra recorded with the crystal spectrometer and the electronic detectors will be reported.

[1] Hui Chen et al., PRL 105, 015003 (2010)

¹The work by LLNL is performed under the auspices of the U.S. DOE by LLNL, Contract DE-AC52-07NA27344; funded by LDRD #10-ERD-044.

Csilla I. Szabo
Artep Inc

Date submitted: 18 Jul 2010

Electronic form version 1.4