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Positron and Gamma-Ray Creation using the Texas Petawatt Laser Irradiating Gold Targets[1] EDISON LIANG, DEVIN TAYLOR, TAYLOR CLARKE, ALEXANDER HENDERSON, PETR CHAGUINE, XIN WANG, Rice University, GILLISS DYER, KRISTINA SERRATTO, NATHAN RILEY, MICHAEL DONOVAN, TODD DITMIRE, University of Texas at Austin — We report preliminary results of the positron and gamma-ray creation experiment performed at the Texas Petawatt Laser (TPW) during the summer of 2012. Of the shots using gold targets, preliminary results suggest that positrons were detected in many of the shots. TPW was operating at around 100 J and 0.5 – 0.8 PW during this experiment, and 25% of the shots achieved peak intensity exceeding 10^{21}W.cm^{-2}. We will report the measured positron spectra, positron angular distribution and positron to hot electron ratio, inferred positron yield and in-situ positron density. The positron energy data will be compared to simultaneous TNSA proton energy data to model sheath acceleration mechanisms. We also measured the bremsstrahlung gamma-ray spectra and angular distributions from the gold targets, using a combination of dosimeters, filter stack spectrometers and forward Compton spectrometer. Target activation data will also be reported.

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