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Ultra-Intense Short-Pulse Pair Creation Using the Texas Petawatt Laser[1] EDISON LIANG, ALEXANDER HENDERSON, TAYLOR CLARKE, Rice University, DEVIN TAYLOR, university of wisconsin, PETR CHAGUINE, Rice University, KRISTINA SERRATTO, NATHAN RILEY, GILLISS DYER, MICHAEL DONOVAN, TODD DITMIRE, University of Texas at Austin — We report results from the 2012 pair creation experiment using the Texas Petawatt Laser. Up to 10^{11} positrons per steradian were detected using 100 Joule pulses from the Texas Petawatt Laser to irradiate gold targets, with peak laser intensities up to $1.9\text{x}10^{21}\text{W/cm}^2$ and pulse durations as short as 130 fs. Positron-to-electron ratios exceeding 20% were measured on some shots. The positron energy, positron yield per unit laser energy, and inferred positron density are significantly higher than those reported in previous experiments. This confirms that, for a given laser energy, higher intensity and shorter pulses irradiating thicker targets are more favorable for pair creation. Narrow-band high-energy positrons up to 23 MeV were observed from thin targets.

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