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Magnetically collimated pair jets at the LLNL Titan laser[1] JACKSON WILLIAMS, HUI CHEN, LLNL, DANIEL BARNAK, RICCARDO BETTI, GENNADY FIKSEL, Laboratory for Laser Energetics, ANDREW HAZI, LLNL, SHAUN KERR, University of Alberta, CHRISTINE KRAULAND, University of California San Diego, ANTHONY LINK, LLNL, MARIO MANUEL, University of Michigan, DAVID MEYERHOFER, Laboratory for Laser Energetics, SABRINA NAGEL, JAEBUM PARK, LLNL, JONATHAN PEEBLES, University of California San Diego, BRADLEY POLLOCK, RICCARDO TOMMASINI, LLNL — Positron-electron pair production experiments were performed at the Titan laser at the Jupiter Laser Facility to investigate the dependence of target thickness and atomic number on pair yield. Externally applied axial magnetic fields, generated by a Helmholtz coil, were used to collimate positrons where the signal observed at the detector increased by a factor of 20 over reference shots without a field. This enabled the detection of positrons from a range of target materials. The emitted positron yield was found to be proportional to the square of the atomic number. This scaling is reduced from the Bethe-Heitler cross section of Z^4 by Compton scattering and the stopping power of the target. Monte Carlo simulations support these conclusions, providing a power-law scaling of emitted positrons for all materials and a range of mm-thick targets.

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