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First demonstration of the Global Spectrometer for Positron and Electron Characterization (GSPEC)[1] G. D. GLENN, C. B. CURRY, G. DYER, E. GALTIER, S. KUSCHEL, C. SCHOENWAELDER, F. TREFFERT, S. H. GLENZER, M. GAUTHIER, SLAC National Accelerator Laboratory, B. M. HEGELICH, E. MCCARY, R. ROYCROFT, G. TIWARI, T. DITMIRE, UT Austin
— In high-intensity laser interactions with solid targets, electrons are accelerated to relativistic energies by the laser electric field, with the temperature of their approximately Maxwellian energy distribution serving as an indirect measurement of the laser-plasma interaction. Nonthermal components of the electron spectrum may be indicative of astrophysically relevant plasma processes such as magnetic reconnection or instabilities driving particle acceleration. To study such interactions, we have developed an imaging plate-based magnetic energy spectrometer to measure the energy spectrum of laser-accelerated electrons with energies from 3–150 MeV.[a] The spectrometer has been designed to optimally resolve the characteristic energies (3–50 MeV) of electrons generated during overcritical laser-plasma interactions. We present preliminary data from a recent experiment using the Titan short-pulse laser in a split-beam configuration (700 fs, 1053 nm, 2x65 J) to identify signatures of magnetic reconnection from nonthermal electron populations.
References: a. G. D. Glenn et al., *JINST* **14** P03012 (2019)

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