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## 8.50 High-energy differential-filtering photon spectrometer for ultraintense laser-matter interactions

Tuesday, 17 April 2018 16:01 (120)

The detection of x-rays in the 100s of keV to MeV range for picosecond laser-matter interactions provides understanding of the laser to relativistic electron coupling, which is critical for applications such as Compton radiography, positron-electron pair production, and TNSA proton generation. Spectroscopy in the range of 0.1-2 MeV is difficult due to the high photon flux for single counting devices; while at such energies, the photons have low interaction cross sections with crystals and Cherenkov detectors. Here, we describe a novel geometry of a step filter to measure high energy bremsstrahlung emission for positron-electron pair production experiments. The design allows for independent determination of a local background noise that reduces the systematic error in the reconstructed spectra. Bremsstrahlung emission was measured for various laser and target conditions and correlated to pair production yields. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344 and funded by the LLNL LDRD program under tracking code 17-ERD-010.

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