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MeV photon source development based on Thomson scattering using compact laser-plasma accelerators[1] HAI-EN TSAI, TOBIAS OSTERMAYR, Lawrence Berkeley National Laboratory, WILLIAM WALLACE, MANFRED AMBAT, University of California Berkeley, KAITLIN DEERING, SAM BARBER, Lawrence Berkeley National Laboratory, FUMIKA ISONO, University of California Berkeley, JEROEN VAN TILBORG, ANTHONY GONSALVES, KEI NAKAMURA, CSABA TOTH, CARL SCHROEDER, CAMERON GEDDES, ERIC ESAREY, Lawrence Berkeley National Laboratory — Compact, narrow bandwidth, femtosecond-pulsed, MeV gamma ray sources have the potential to offer important advances across a number of fields, including nuclear nonproliferation, chemistry, medicine, and photon nuclear activation. The BELLA Center aims to produce such sources through Thomson scattering of a laser from the electron beam of a laser-plasma accelerator (LPA). A recently completed 100 TW laser system is delivering 2.8 J and 38 fs pulses at 5 Hz repetition rate on target to consistently produce 120 MeV, 50 pC stable LPA electron beams. A newly commissioned designated "scatter" line will deliver 0.7 J, 38 fs pulses on target. Through independent control of pulse shape and laser guiding, high flux and narrow energy spread can be achieved. The presentation will focus on progress toward this goal with particular focus on the techniques required for spatial and temporal overlap between focused beams, beam stability studies, and the MeV gamma ray diagnostics employed in the research.

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Hai-En Tsai
Lawrence Berkeley National Laboratory

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