Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Laser-Plasma Accelerator based compact, narrow bandwidth Thomson photon sources C.G.R. GEDDES, S.G. RYKOVANOV[1], J.-L. VAY, A. BONATTO, C.B. SCHROEDER, E. ESAREY, W.P. LEEMANS, LBNL — Compact, high-quality photon sources at MeV energies can be enabled by recent advances in Laser-Plasma Accelerator (LPA) beam quality (e.g. 1% level energy spread, low emittance) together with photon production strategies which take advantage of unique beam and plasma capabilities. LPA experiments will be reviewed which establish the basis for such a source. Simulations show that for electron beam parameters achieved in LPAs, plasma optics can be used to tailor beam divergence and minimize photon source bandwidth in a compact package. Source yield can be increased, for realistic laser parameters, via use of plasma channels to guide the scattering laser and/or control of laser pulse shape and chirp. The LPA can further be used to de-accelerate the electron beam after photon production to reduce undesired radiation. This is crucial to a laboratory or field operable source. The combination of these elements will be presented, towards a complete LPA-based high-flux photon source which is compact.

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Date submitted: 11 Jul 2014 Electronic form version 1.4