Abstract Submitted
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Design of Compton Scatter Magnetic Spectrometer for Characterization of Thomson Scattered Photon Sources[1] ROBERT JACOB, TOBIAS OSTERMAYR, HAI-EN TSAI, ALEXANDER LAUT, LIONA FANCHIANG, BRIAN QUITER, CAMERON GEDDES, CARL SCHROEDER, ERIC ESAREY, Lawrence Berkeley National Laboratory, BELLA HTT TEAM — Thomson scattering of intense laser pulses from laser-plasma accelerator generated electron beams can provide a source of quasi-monoenergetic few-MeV photons. Such sources will reduce dose and increase sensitivity for active interrogation techniques. Development of these sources requires proper diagnostics for the resultant MeV photon pulse. This has proven difficult due to the high scattered photon energies and tens-of-femtosecond pulse durations. A powerful diagnostic tool would allow the user to effectively attribute the energy-angle dependence of the photon spectrum to parameterized characteristics of the electron beam, such as energy and divergence distributions. Active research is underway to develop a Compton scatter magnetic spectrometer that will allow for such characterization of these LPA-sourced electron beams for 1-10 MeV scattered photons. Simulation of these Thomson scattered sources has shown that determination of electron peak energy is readily achievable, with the potential for more detailed analysis using spatial data at the magnetic spectrometer scintillator. Future efforts will focus on the development of necessary methods for calculating electron beam energy-angle distribution characteristics.

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