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A Compact, Multiangle Electron Spectrometer for Ultra-Intense Laser–Plasma Interaction Experiments O.V. GOTCHEV, D.D. MEYERHOFER, C. STOECKL, Laboratory for Laser Energetics, U. of Rochester — In the fast ignitor scheme for inertial confinement fusion, one of the main challenges is the efficient coupling of the ignitor laser pulse into kinetic energy of forward-going electrons and the transport of these from the critical surface to the compressed core. Experiments on LLE's multiterawatt (MTW) laser will study the effect of the focal-spot shape on the forward acceleration and collimation of electrons. A compact electron spectrometer has been developed to simultaneously record the energy spectra of electrons ejected from the intersection of the laser focus with various targets at multiple angular locations. A modular system with replaceable magnets, the spectrometer provides an adjustable energy band that is currently 0.2 to 5 MeV. The detector is an array of imaging plates and is designed to operate in the high-noise MTW environment (bremsstrahlung and Compton x rays, gamma rays, scattered electrons), while being compact enough to fit in the diagnostic space of the target chamber. The detector geometry and shielding were optimized with the particle/radiation transport code GEANT4. The required dynamic range, sensitivity, and resolution are satisfied with this detector choice. This work was supported by the U.S. Department of Energy under Cooperative Agreement No. DE-FC52-92SF19460.

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