Abstract Submitted
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Energy and Time-resolved Measurements of High Energy Electrons Emitted from a Laser-Plasma Interaction[1] LEE ELBERSON, U. Maryland, YUAN PING, RONNIE SHEPHERD, ANDREW MACKINNON, PRAVESH PATEL, LLNL, WENDELL HILL, U. Maryland — Irradiating materials with high energy, short pulse lasers create rapidly evolving plasma states. Deconvolving the physical mechanisms responsible for the plasma evolution necessitates time-resolved diagnostic measurements. In the high energy density regime, electrons dominate energy transport within the plasma, making them an obvious candidate for study. We recently demonstrated a novel technique for observing time-resolved energy spectra of hot electrons escaping from the target. Exploiting this technique, we measured high energy (∼MeV) electrons accelerated from a solid foil (∼10 micron) irradiated by a high intensity ($>10^{19}$ W/cm^2), short pulse (∼100fs) laser. Preliminary analysis shows hot electron lifetimes on the order of 10 ps. Future experiments will combine the above technique with a time-resolved measurement of K-alpha emission, which gives insight into the refluxing electrons.

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