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Hot Electron and Positron Energy Distributions from Ultra-Intense Laser Solid Interactions HUI CHEN, SCOTT WILKS, W. KRUER, S. MOON, N. PATEL, P. PATEL, R. SHEPHERD, R. SNAVELY, Lawrence Livermore National Laboratory, LLNL TEAM — We present experimental data of electron energy distributions from ultra-intense (greater than 10^{19} W/cm^2) lasersolid interactions using the Rutherford Appleton Laboratory Vulcan petawatt laser. These measurements were made using a magnetic spectrometer that used both CCD and image plates as detectors. We present details on the distinct effective temperatures that were obtained for a wide variety of targets as a function of laser intensity. In addition, we will also present the results of our first attempt at simultaneously measuring the positron energy distribution, along with the electrons. Positrons can be produced during these experiments if the number and effective temperature of hot electrons exceeds a threshold value, which we satisfied by using a gold target, and we report on possible signatures of positrons. This additional information is yet another point of information that allows for better determination of the effective electron temperature that exists in these targets.

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