Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Short Pulse Laser Absorption and Energy Partition at Relativistic Laser Intensities[1] YUAN PING, HUI CHEN, R. SHEPHERD, G. DYER, A. FAENOV, J. HUNTER, K. WIDMANN, T. PIKUZ, H. CHUNG, K. FOURNIER, S. HANSEN, S. WILKS, Lawrence Livermore National Laboratory — We present the first absorption measurements at laser intensity between 10^{17} to 10^{20} W/cm^2 using an intergrating sphere and a suite of diagnostics that measures scale length, hot electrons and laser harmonics. A much-enhanced absorption in the regime of relativestic electron heating was observed. Furthermore, we present measurements on the partitioning of absorbed laser energy into thermal and non-thermal electrons when illuminating solid targets from 10^{17} to 10^{19} W/cm^2. This was measured using a sub-picosecond x-ray streak camera interfaced to a dual crystal von Hámos crystal spectrograph, a spherical crystal x-ray imaging spectrometer, an electron spectrometer and optical spectrometer. Our data suggests an intensity dependent energy-coupling transition with greater energy portion into non-thermal electrons that rapidly transition to thermal electrons. The details of these experimental results and modeling simulations will be presented.

[1]Work performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under Contract No. W-7405-ENG-48.

Hui Chen
Lawrence Livermore National Laboratory

Date submitted: 02 Aug 2005 Electronic form version 1.4