Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

**Observation of rapid energy transfer from relativistic, short pulse laser generated electrons to solid material**[1] R. SHEPHERD, H. CHEN, Y. PING, LLNL, G. DYER, Univ. of Texas, Austin, S. WILKS, LLNL, H.-K. CHUNG, Univ. of California, Berkeley, K. FOURNIER, A. NILES, A. KEMP, S. HANSEN, K. WIDMANN, LLNL, A. FAENOV, T. PIKOZ, VNIIFTRI, Moscow Region, Russia, P. BEIERSDORFER, LLNL — With the advent of high intensity ultra-short pulse lasers, relativistic electron generation in laser-solid interactions is common in laboratory plasmas. The coupling of these electrons to the surrounding matter plays a critical role in short pulse laser applications such as harmonic generation [1], short pulse x-ray production [2], and fast ignition [3]. We present the experimental observation of the energy transfer and damping rate of relativistic electrons in solid density matter. In general, this data provides a unique window into the time scale for collisional relaxation between relativistic particles and cold classical particles in a dense medium.

[1] Dromet, B., et. Al, "High hamonic generation in the relativistic limit," *Nature*, **2**, 456-459, (2006).
[2] Salzmann, D., et al, "Theory of $K$-$\alpha$ generation by femtosecond laser-produce hot electrons in thin foils," *Phys. Rev. E.,* **65**, 036402-1-5, (2002).
[3] Kodama, R., et al, "Fast heating of ultrahigh-density plasma as a step towards laser fusion ignition," *Nature*, **412**, 798-801, (2001).

[1]This work performed under the auspices of the U.S. DoE by LLNL under Contract DE-AC52-07NA27344.

Ronnie Shepherd
Lawrence Livermore National Laboratory

Date submitted: 21 Jul 2008 Electronic form version 1.4