Abstract Submitted
for the SHOCK07 Meeting of
The American Physical Society

Coherent THz frequency radiation from shock waves: A new ultrafast strain wave detection mechanism[1] EVAN REED, MICHAEL ARMSTRONG, Lawrence Livermore National Laboratory, KIYONG KIM, JAMES GLOWNIA, Los Alamos National Laboratory — Using molecular dynamics simulations and analytics, we predict that large amplitude strain and shock waves can generate detectable electromagnetic radiation at an interface between two different piezoelectric materials. This new form of radiation generation is coherently related to the temporal profile of the strain wave propagating past the interface and can be utilized as a wireless ultrafast strain wave detector with potentially unprecedented subpicosecond time resolution. We present the first experimental observation of this effect at an interface between aluminum and GaN and find excellent agreement with picosecond timescale simulations.

[1]This work was performed under the auspices of the US Department of Energy by the University of California, LLNL under contract number W-7405-Eng-48.

Evan Reed
Lawrence Livermore National Laboratory

Date submitted: 23 Feb 2007 Electronic form version 1.4