

**Shock Compression Seminar Series
APS GSCCM Announcement**

Tuesday, July 13, 2021 at 12:00 PM Eastern Time

Optically Excited and Monitored Laterally Propagating Shock Waves

*Professor Keith Nelson
Massachusetts Institute of Technology*

We have developed methods for optical generation and measurement of shock waves that propagate laterally relative to the optical beam directions. The approach enables facile observation of shock propagation and subsequent shock-induced material responses as well as optical control over shock characteristics. Focusing shock waves, multiple shocks, and shocks that interact with micron-size target samples can be generated and monitored. We have used the technique to study energetic material decomposition in detail, revealing new shock-induced dynamical responses. We have also observed cavitation, phase transitions, film-substrate delamination, and microarchitected material responses. We routinely achieve pressures of tens of GPa, and prospects for reaching far higher pressures will be discussed.

A brief review of allied methods that may be of interest to the shock compression community will also be presented. These include nondestructive optical excitation of weak shocks; optically launched microparticle impact measurements and determination of hardness at high strain rates; optical generation of compressional, shear, and surface acoustic waves in the MHz-GHz frequency ranges; and dynamic mechanical measurements spanning 13 decades from mHz to GHz frequency ranges.

For more information, or to recommend future speakers contact Seminar Organizer, Tracy Vogler at tjvogle@sandia.gov or the GSCCM Secretary/Treasurer Matt Lane at jlane@sandia.gov.