Shock Compression Seminar Series
APS GSCCM Announcement

Tuesday, November 10, 2020 at 12:00 PM Eastern Time

Watching Solids and Liquids Through the Ultrafast Shock Compression Microscope

Professor Dana Dlott
University of Illinois at Urbana-Champaign

We have developed a microscope that looks into solids and liquids as they are subjected to controlled high velocity impacts from laser-launched flyer plates. This convenient tabletop microscope set up allows us to perform well-characterized controlled shock experiments on tiny samples hundreds of times per day. The flyer plates move a few kilometers per second, creating intense mechanical and thermal effects that can trigger new kinds of chemistry. One of these impacts can create pressures of 200,000 atm and temperatures of 4000K while compressing matter to twice its density. In this talk, I will describe the shock compression microscope and the peripheral high-speed optical diagnostics that measure pressure, temperature, density and composition in real time. I will mention applications ongoing in my lab, such as metal-organic frameworks as shock energy absorbers, proteins under shock compression and molecular photophysics in shock-compressed matter. Then I will discuss shock initiation and detonation of high explosives, including liquid explosives and plastic-bonded explosives. This shock compression microscope has many applications in chemistry, physics, materials science and biology and it lets us see right inside detonating high explosives with high time and space resolution

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