

**Shock Compression Seminar Series  
APS GSCCM Announcement**

**Tuesday, January 12, 2021 at 12:00 PM Eastern Time**

**Talk 1: HMX Solvent Inclusion: Implications on Initiation Sensitivity?**

*Dr. Christopher Molek  
Air Force Research Laboratory*

We have detected and propose a plausible understanding of the impacts of solvent entrapment in HMX. Solvent inclusions can have significant impacts on aging and performance, as observed with RDX. In HMX, it was determined that solvent inclusions generate tortuous void structures. The structures are on the scale which may impact the initiation behavior and performance. A detailed look at the solvent inclusions revealed buoyant bubbles which orient themselves depending on the crystal position. Impacts of these findings have been systematically studied using CTH modeling and simulations. Overall results are described with potential impacts on initiation.

**Talk 2: Gun-driven, short-pulse explosive initiation experiments**

*Dr. Christopher "Kit" Neel  
Air Force Research Laboratory*

A capability to launch relatively thin fliers using powder and gas guns was recently developed. This presentation will show the results of applying that capability to a generic RDX-based explosive both in the form of solid pellets and in the form of discs containing embedded particle velocity tracking gauges. The results show excellent agreement on pellet initiation in the range where complementary data is available, and they also substantially extend the range of data available. On embedded gauge samples, we observed extended run distances as the ignition threshold was approached. A significant outcome of the work is a simple ignition criterion that links the Pop-plot and the initiation curve through a straightforward attenuation idea. The new criterion provides a physically-based rationale for previous 'time-scaling' observations between the Pop plot and initiation curve, and also assists in interpreting the extended run distances. This culminates in a dimensionless relationship between input pulse duration and shock-to-detonation run distance that may be widely applicable.