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High fidelity probing of chemical moieties present in detonation plasmas STEPHANIE JOHNSON, NICK GLUMAC, None — The intersection of multiple shock waves offers new extreme conditions of pressure, temperature, and shear flow that would not be seen under normal planar detonation conditions. A significant gap in knowledge exists between the computationally modeled and actual physicochemical cascades occurring in the initial stages of the conversion/coupling of energy released during detonation. Experimental results show intensified temperatures and pressures where multiple shocks merge and exhibit a reactive behavior varying from the classical detonation theory based on C-J or ZND models. A newly-developed technique enables the collection of simultaneous imaging and spectra as detonation evolves. The HSFC data is gated to timescales fast enough to avoid the obscuring carbon soot associated with the detonation fireball and maps UV/VIS/NIR emission spectra in a 50 ?m line across the surface. This technique is able to provide information on molecular species present in and the rotational and vibrational molecular energies occurring within the ionized plasma. Extensive studies have been done on plasmas from reacting energetic materials but their role in the formation and self-propagation of the shock waves is unclear.

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None

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