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Probing Shocked Materials with Time-resolved Raman Scattering DMITRO MARTYNOWYCH, KEITH NELSON, Massachusetts Institute of Technology — We present methods to acquire time-resolved Raman spectra of shocked materials in a single shot. A thin layer (5-50 m) of material is pressed between two glass plates, confining it to a planar geometry. A sub-nanosecond laser pulse is focused into a circular "ring" pattern of 200 m radius, launching a shock wave that propagates within the plane of the sample and focuses toward the circle's center. This converging geometry generates regions of high pressure at its focus. We couple this technique with single-shot femtosecond stimulated Raman scattering which yields a full stokes an anti-stokes Raman spectra. A spectral broad (˜100 fs) white-light probe pulse, and a spectral narrow (˜1 ps) pump pulse are spatiotemporally overlapped on the sample. These pulses drive stimulated Raman transitions which manifest as stimulated loss and gain on the broadband probe pulse.

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