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Initial results from a multiplexed radiance-reflectance diagnostic THOMAS OTA, AWE Plc. & Institute of Shock Physics, Imperial College London, DANIEL EAKINS, DAVID CHAPMAN, Institute of Shock Physics, Imperial College London — Pyrometry is an established diagnostic for the measurement of temperature in high strain rate experiments such as plate impact experiments. By collecting the thermal emission from a shocked sample its temperature may be estimated by applying Planck's Law. This approach is susceptible to significant uncertainty originating from possible changes in emissivity after the sample has been shocked; thus it is desirable to determine emissivity during the experiment. Kirchhoff's Law, which states emissivity is the complement of reflectivity, can be applied to determine emissivity in high strain rate experiments. Ideally the sample's reflectivity would be measured at the same wavelength and on the same experiment as the pyrometry measurement. We describe the development of a diagnostic that produces a modulated reflectivity signal that is insensitive to tilt and surface finish. Following characterisation of the system in the laboratory, dynamic tests were conducted. The reflectivity signal was multiplexed onto a radiance signal allowing simultaneous measurement of radiance and reflectivity. A description of the diagnostic, results from laboratory testing and results and analysis from dynamic experiments are presented.

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