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A multi-phase Equation of State diagnostic applied to the study of shock loaded tin CAROLINE SHENTON-TAYLOR, ANTONY GLAUSER, THOMAS OTA, ED PRICE, AWE — The accurate detection of shock driven material phase transitions demands a multiple diagnostic capable of simultaneously measuring temperature, emissivity, pressure and velocity. By combining optical pyrometry with reflectivity based emissivity diagnostics we report shock loaded tin temperatures from 820 K to 1780 K with associated probable errors down to +/- 12.8 K. In addition simultaneous Class 4 laser heterodyne velocimetry recorded the tin surface velocity as viewed through a LiF anvil. Constraining the tin pressure with lithium fluoride generated microsecond experiment time durations; thermal diffusion models identified the tin/glue/LiF layer as advantageous for temperature measurement. Across a range of pressures, the emissivity corrected temperature data were found to be well aligned with a single tin Equation of State model.

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