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Analysis of Visible Spectra and Imaging Data from Hypervelocity Impact Experiments[1] JOSEPH MACFARLANE, I. GOLOVKIN, P. WOODRUFF, Prism Computational Sciences, R. NANCE, J. COGAR, A. WARD, Corvid Technologies, W. REINHART, T. THORNHILL, Sandia National Labs, J. GRUN, R. LUNSFORD, Naval Research Laboratory — In a recent series of light-gas-gun experiments performed at Sandia National Laboratories, high-velocity aluminum projectiles impacted titanium target plates at velocities of 6 km/sec. The impact produces a hot debris cloud that expands off the rear surface of the target plate. The experiments provided data which included high-speed camera images, time-resolved emission spectra, and absolute flux levels. Data from the experiments were analyzed using hydrodynamics and radiation physics simulation codes, including the CTH shock physics code and the SPECT3D imaging and spectral analysis code. CTH is used to predict the time-dependent spatial distributions of the debris cloud material density distributions and temperatures, while SPECT3D computes simulated spectral and imaging diagnostics based on material conditions. Here, we discuss the analysis of the spectral and imaging data, including vapor temperatures determined from spectral emission lines, and overall absolute radiation flux from the debris cloud based on the calibrated imaging data.

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