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Quantitative schlieren measurement of shock wave pressure profile JESSE TOBIN, MICHAEL HARGATHER, New Mexico Tech — Quantitative schlieren imaging is used to measure the pressure profile of a shock wave in air. The quantitative schlieren technique uses a weak lens calibration object to relate pixel intensity values in schlieren images to a known refractive index gradient. The refractive index gradient is converted to a density gradient, which in turn is converted to a pressure distribution using an approximated local air temperature. A high-speed digital camera is used to record schlieren images of shock wave propagation. Post-processing of the image record determines the changes in pixel intensity, and thus the density and pressure distributions across the shock front. The calculated pressure profile is compared to measurements performed using a piezoelectric pressure transducer. The quantitative schlieren measurement approach is benchmarked using a laminar flat plate free-convection boundary layer.

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