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Mixing-model Sensitivity to Initial Conditions in Hydrodynamic Predictions[1] JOSIAH BIGELOW, HUMBERTO SILVA, Sandia National Laboratories, C RANDALL TRUMAN, PETER VOROBIEFF, Univ of New Mexico —
Amagat and Dalton mixing-models were studied to compare their thermodynamic prediction of shock states. Numerical simulations with the Sandia National Laboratories shock hydrodynamic code CTH modeled University of New Mexico (UNM) shock tube laboratory experiments shocking a 1:1 molar mixture of helium (He) and sulfur hexafluoride (SF_6). Five input parameters were varied for sensitivity analysis: driver section pressure, driver section density, test section pressure, test section density, and mixture ratio (mole fraction). We show via incremental Latin hypercube sampling (LHS) analysis that significant differences exist between Amagat and Dalton mixing-model predictions. The differences observed in predicted shock speeds, temperatures, and pressures grow more pronounced with higher shock speeds.

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