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A comparison of discrete-ordinates and flux-limited-diffusion methods for modeling radiation transport in radiative shock tubes[1] ERIC S. MYRA, University of Michigan, WM. DARYL HAWKINS, Texas A&M University — The Center for Radiative Shock Hydrodynamics (CRASH) seeks to improve the predictive capability for models of Omega laser experiments of radiative shock waves. The laser is used to shock, ionize, and accelerate a beryllium plate into a xenon-filled shock tube. These shocks, when driven above a threshold velocity of about 60 km/s, become strongly radiative and convert most of the incoming energy flux into radiation. Radiative shocks have properties that are significantly different from purely hydrodynamic shocks and, in modeling this phenomenon numerically, it is important to compute radiative effects accurately. In this presentation, we examine approaches to modeling radiation transport by comparing two methods: (i) a computationally efficient approximation (multigroup flux-limited diffusion), currently in use in the CRASH code, with (ii) a more accurate discrete-ordinates treatment that is offered by the code PDT. We present a selection of results from a suite of comparison tests, showing both idealized problems and those that are representative of conditions found in the CRASH experiment.

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