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Measurements of X-ray energy flow through evolving density gradients to validate the modeling of stellar atmospheres P. GRAHAM, J. FOSTER, A. MOORE, M. TAYLOR, AWE Aldermaston, UK, S. MACLAREN, P. YOUNG, G. GLENDINNING, A. REIGHARD, C. SORCE, LLNL Livermore, USA, C. BACK, J. HUND, B. BLUE, GA, San Diego, USA — Density perturbations, such as N-waves, in stellar atmospheres are coupled to the X-ray radiation field and so their evolution is challenging to simulate [1]. To assess current modeling capabilities an analogous problem was generated on the LLE OMEGA laser using a hohlraum to drive X-rays through tantalum aerogel with an initial seed perturbation. X-rays diffuse preferentially through the lower density material and the flow changes over time as the heated mass evolves. The energy flow was diagnosed using two methods, direct flux and hohlraum calorimetry, which are compared to assess the best technique. In both cases multiple flux diagnostics on different lines of sight were used, including photodiode and photoconductive detectors, to crosscheck results. In addition, 2D framing images of X-ray emission were taken to correlate with the flux measurements. The suite of data will be presented and compared against modeling.
[1] Mihalas & Mihalas, 'Foundations of Radiation Hydrodynamics', Dover (1999).

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