Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Modeling Compressed Turbulence with BHR DANIEL ISRAEL, Los Alamos National Laboratory — Turbulence undergoing compression or expansion occurs in systems ranging from internal combustion engines to supernovae. One common feature in many of these systems is the presence of multiple reacting species. Direct numerical simulation data is available for the single-fluid, low turbulent Mach number case. Wu, et al. (1985) compared their DNS results to several Reynolds-averaged Navier-Stokes models. They also proposed a three-equation $k - \varepsilon - \tau$ model, in conjunction with a Reynolds-stress model. Subsequent researchers have proposed alternative corrections to the standard $k - \varepsilon$ formulation. Here we investigate three variants of the BHR model (Besnard, 1992). BHR is a model for multi-species variable-density turbulence. The three variants are the linear eddy-viscosity, algebraic-stress, and full Reynolds-stress formulations. We then examine the predictions of the model for the fluctuating density field for the case of variable-density turbulence.

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Date submitted: 05 Aug 2011 Electronic form version 1.4