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High-energy-density compressible turbulence in the counterpropagating shear experiment F.W. DOSS, E.N. LOOMIS, K.A. FLIPPO, L. WELSER-SHERRILL, J.R. FINCKE, Los Alamos National Laboratory — The Los Alamos reshock and shear campaign aims to assess models for turbulence under high-energy-density conditions. Experiments carried out on the OMEGA laser facility created high-speed shear regions (80 km/s each side) in CH foam ($\sim$200 mg/cc post-shock) which excited a shear instability and drove the spreading of a high density and temperature ($\sim$1 g/cc, 14 eV) aluminum shear layer. The experiments have been analyzed in the context of the BHR turbulence model (a Reynolds-averaged turbulence model of k-ϵ type extended to include variable density effects) implemented in the RAGE radiation hydrocode. Results confirm that the observed spreading of the layer is due to instability leading to turbulence, that the results of the experiment can be tied to the function of specific model coefficients, and that compressibility effects and large density gradients play an important role, making this data important for the ongoing validation of HED turbulence models. Los Alamos National Laboratory is operated by Los Alamos National Security, LLC for the U.S. DOE NNSA under contract DE-AC52-06NA25396.

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