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Evaluation of the Predictions of a Four-Equation Reynolds-Averaged Navier-Stokes Model Applied to Rayleigh-Taylor Instability-Induced Mixing[1] KYLE K. MACKAY, Utah State University, OLEG SCHILLING, Lawrence Livermore National Laboratory — An implicit-in-time multicomponent, weighted essentially nonoscillatory implementation of a four-equation K-ϵ based Reynolds-averaged Navier–Stokes model is used to simulate Rayleigh–Taylor turbulent mixing at Atwood numbers ranging from 0.05–0.9. The mechanical turbulence equations are coupled to modeled transport equations for the scalar variance and its dissipation rate. The predicted evolution of the mixing layer, molecular mixing and other quantities are compared to available experimental data, as well as to analytical self-similar solutions. The predictive capability of the model is evaluated, and several parametric studies are also presented.

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