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Direct Numerical Simulation of Rayleigh-Taylor Instability[1]
ANDY COOK, BILL CABOT, PAUL MILLER, LLNL — Results from a 3072 x 3072 x 3072 point Direct Numerical Simulation of Rayleigh-Taylor instability indicate that the alpha parameter cannot be accurately measured by fitting a curve to the width of the mixing region, but can only be obtained by recourse to the similarity equation for the growth rate. The data further establish that the ratio of kinetic energy to released potential energy is not constant, except perhaps at extremely large Reynolds numbers. The simulated flow attains a Reynolds number of 32,000, surpassing the mixing transition. The latter stages of the calculation reveal a weak Reynolds number dependence, which may have profound consequences for modeling very high Reynolds number flows.

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