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Direct numerical simulation of Richtmyer-Meshkov instability with broadband initial perturbations MICHAEL GROOM, BEN THORNBER, The University of Sydney — The effects of Reynolds number on the early to intermediate time behaviour of a mixing layer induced by Richtmyer-Meshkov instability (RMI) are investigated through a series of direct numerical simulations (DNS) using the finite-volume code FLAMENCO. This study presents, for the first time, results from direct numerical simulations of RMI evolving from amplitude perturbations containing a broad bandwidth of initial modes. In particular, two different broadband perturbations are analysed, defined by their initial radial power spectra $P(k) = Ck^m$ where $m = -1, -2$. The amplitudes of individual modes are defined such that the total standard deviation of the two perturbations are the same and all modes are initially linear. The DNS results are compared with implicit large eddy simulations (ILES) of the same initial conditions in the high Reynolds number limit, showing that although there is significant suppression of turbulence in the low Reynolds number DNS, the growth in integral width W is higher. This increased growth in W is found to be due to high levels of molecular diffusion, indicating that there are substantial Schmidt number effects present at low Reynolds numbers in RMI mixing layers.

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