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A numerical study of a two-fluid channel flow instability SIINA HAAPANEN, BRIAN CANTWELL, Stanford University — Results from a three-dimensional direct numerical simulation of an initially laminar two-fluid channel flow are presented. The fluids are incompressible and miscible with dissimilar densities and viscosities. They are initially separated by a thin mixed layer, and instability of the flow results in entrainment and mixing of the fluids. In the calculations, perturbations are supplied by linear stability theory, and the temporal evolution of the flow is computed to the non-linear stage. The influence of initial conditions on the subsequent flow evolution is investigated, the effects of fluid density and viscosity ratios and relative depth of the fluid layers are studied, and mixing and entrainment are discussed.

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