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Initially Isotropic Turbulence Subjected to Stabilizing Stratification STEVE DE BRUYN KOPS, University of Massachusetts Amherst, JAMES RILEY, University of Washington — When turbulence in a stably stratified fluid decays, it often does so without a continuous source of energy. As a result, the turbulence time scale increases relative to the buoyancy time scale so that the Froude number F deceases in time. In wakes, for instance, scaling arguments lead us to expect $F \sim O(1)$ one buoyancy period after the object has passed, and extensive studies have been carried out to understand how wakes evolve as the buoyancy force becomes increasingly important in time. Even in the unstratified case, though, a turbulent wake is a complicated flow to study. A much simpler configuration is isotropic homogeneous turbulence (IHT). For this study, simulated IHT that exhibits power-law decay is suddenly subjected to stabilizing stratification. The simulations use up to 8192x8192x4096 grid points to resolve the largest and smallest length scales of the flow over a span of at least 10 buoyancy periods. Two Reynolds numbers differing by an order of magnitude are considered, with the lower Reynolds number having a range of turbulence length scales comparable to that in laboratory experiments of stratified turbulent wakes. In this paper, the evolution of the flow as F deceases with time is discussed, as is the effect of the initial Reynolds number.

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