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Direct numerical simulations of stratified turbulence at higher Reynolds numbers[1] VISHAL VASAN, OLOF GRUNDESTAM, JAMES RILEY, University of Washington, PUI-KUEN YEUNG, Georgia Tech. — Stratified turbulence[2] is a flow dominated by stable density stratification, and is characterized by low internal Froude numbers and high Reynolds numbers; such parameter regimes occur often in the atmosphere and oceans. We report on direct numerical simulations of stratified turbulence at very high resolution (up to 2048^3 grid points) enabling, in particular, fairly high Reynolds numbers to be achieved, well above the critical value at which instabilities and smaller-scale turbulence are expected to occur. A highly parallelized 3D Fourier pseudo-spectral code based on a "pencils" domain decomposition is used to solve the Navier-Stokes equations, and the Boussinesq approximation is made in accounting for stable density stratification. Both decaying and statistically stationary, forced flows are simulated. We examine various features of the flows, including the spectral energy transfer, horizontal fluid particle dispersion, mechanisms leading to instabilities and smaller-scale turbulence, and the parameterization of these flows for larger-scale models.

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[2]D.K. Lilly, 1983, *J.Atmos. Sci.*, **40**, 749.

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