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Turbulent mixing at high Schmidt number: new results from a hybrid spectral compact finite difference and dual grid resolution approach[1] M.P. CLAY, P.K. YEUNG, Georgia Tech, T. GOTOH, Nagoya Inst Tech, Japan — Turbulent mixing at high Schmidt number (Sc) (low molecular diffusivity) is characterized by fluctuations that arise at sub-Kolmogorov scales and are hence difficult to resolve or measure. Simulations in the recent past have provided some basic results but were still limited in either the Reynolds number or the Schmidt number. We have developed a massively parallel implementation of a hybrid pseudo-spectral and combined compact finite difference technique [Gotoh *et al. J. Comput Phys.* **231**, 7398-7414 (2012)] where the velocity and scalar fields are computed at different grid resolutions (the latter up to 8192^3). A specific target is the scalar field maintained by a uniform mean gradient at Taylor-scale Reynolds number 140 and $Sc = 512$, which is comparable to the value (700) for salinity in the ocean. Preliminary results at moderately high Sc are in support of Batchelor (k^{-1}) scaling for the spectrum in the viscous-convective range, followed by exponential fall-off in the viscous-diffusive range. Data over a wide range of Reynolds and Schmidt numbers are used to examine the approach to local isotropy and a saturation of intermittency suggested by previous work.

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