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Learning about High Schmidt scalar mixing in turbulent round jets from 3D periodic box simulations GUILLAUME BLANQUART, KYUPAECK JEFF RAH, California Institute of Technology — Jet-centerline (JC) forcing technique was developed to create velocity and scalar fields of turbulent round jets in triply periodic box. This forcing method is here utilized to simulate high Schmidt number passive scalars mixing. A series of DNS have been performed to compare scalar statistics over a range of Schmidt and Reynolds numbers. For a given Schmidt number, the turbulent scalar flux increases with Reynolds number. This increase is in contrast with the values for unity Schmidt number cases, whose increase with Reynolds number is either small or unapparent. For a given Reynolds number, the flux values decrease with the Schmidt number. Turbulent scalar flux values for infinity Schmidt numbers are extrapolated from the simulations at finite Schmidt numbers. These estimates are in good agreement with jet experiments. Scalar energy spectra have been computed as well, and their scaling exponents, n, have been estimated. At a fix Reynolds number, the value of n decreases as the Schmidt number increases. At a fix Schmidt number, the n value increases with the Reynolds number. Once again, values extrapolated for infinite Schmidt numbers compare well with experimental observations.

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