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Diffusion and dispersion characteristics of hybridized discontinuous Galerkin methods for under-resolved turbulence simulations RODRIGO MOURA, Imperial College London, PABLO FERNANDEZ, MIT, GIANMARCO MENGALDO, California Institute of Technology — We investigate the dispersion and diffusion characteristics of hybridized discontinuous Galerkin (DG) methods. This provides us with insights to develop robust and accurate high-order DG discretizations for under-resolved flow simulations. Using the eigenanalysis technique introduced in (Moura et al., JCP, 2015 and Mengaldo et al., Computers & Fluids, 2017), we present a dispersion-diffusion analysis for the linear advection-diffusion equation. The effect of the accuracy order, the Riemann flux and the viscous stabilization are investigated. Next, we examine the diffusion characteristics of hybridized DG methods for under-resolved turbulent flows. The implicit large-eddy simulation (iLES) of the inviscid and viscous Taylor-Green vortex (TGV) problems are considered to this end. The inviscid case is relevant in the limit of high Reynolds numbers *Re*, i.e. negligible molecular viscosity, while the viscous case explores the effect of *Re* on the accuracy and robustness of the simulations. The TGV cases considered here are particularly crucial to under-resolved turbulent free flows away from walls. We conclude the talk with a discussion on the connections between hybridized and standard DG methods for under-resolved flow simulations.

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