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Multiscale space–time adaptive simulation of 2D incompressible turbulence JAHRUL ALAM, NICHOLAS KEVLAHAN, McMaster University, OLEG VASILYEV, University of Colorado at Boulder — A space–time adaptive wavelet collocation method is developed to efficiently simulate two-dimensional incompressible turbulence. This new DNS technique takes advantage of the spatial and temporal intermittency of turbulence to approximate the solution in the space–time domain using an adaptive collocation wavelet method. Both spatial and temporal resolution are adapted locally to solve the vorticity equation to the desired tolerance. Note that the global time integration error is controlled: this is not possible using conventional time marching methods. We will present results for the merging of identical vortices at Re = 1000, and for decaying two-dimensional turbulence. We find that the total number of active space–time degrees of freedom is significantly smaller than in a conventional dynamically adaptive time marching method. We also expect to present an estimate of the number of space–time degrees of freedom for decaying 2D turbulence as a function of Reynolds

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