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Hybrid simulations of enormous numbers of polymers dispersed in decaying isotropic turbulence

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Summary

The effects of polymer additives on decaying isotropic turbulence were numerically investigated using a hybrid approach. The approach consisted of a Brownian dynamics simulation with an enormous number of dumbbells

and a turbulence DNS with large-scale parallel computations. A reduction of the energy dissipation rate and modification of the kinetic

energy spectrum were observed when the reactions of the polymers were incorporated into the fluid motion. We found that results with few polymers and large replicas could approximate those with many polymers and smaller replicas as far as the large-scale statistics were concerned.