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LES of droplet-laden isotropic turbulence using artificial neural networks ANDREAS FREUND, ANTONINO FERRANTE, University of Washington — Developing accurate SGS models for LES is important for making the simulation of high-Reynolds-number turbulence computationally feasible. We are particularly interested in the LES of decaying homogeneous isotropic turbulence laden with finite-size droplets. Only until recently has the DNS of such flows become possible (Dodd & Ferrante, *J. Fluid Mech.* 806 (2016), 356–412), meaning that their LES is relatively unstudied. Part of the challenge of creating LES models for such flows is that their multiphase nature introduces additional closure terms besides just SGS stress. Using DNS data, we analyze these terms a priori to determine which are sufficiently significant to warrant modeling. We then employ artificial neural networks to develop models for these terms and show in our a posteriori analysis that our LES faithfully reproduces the decay of TKE seen in DNS.

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