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**Low-dissipation strategies for simulating compressible turbulent multiphase flows**[1] MICHAEL B. KUHN, OLIVIER DESJARDINS, Cornell University — Simulating compressible, multiphase flows requires a robust numerical solver, due to the discontinuities introduced by shocks and phase interfaces. Geometric transport schemes and pressure projection schemes both provide stability and the freedom to take larger timesteps, but these also introduce spurious dissipation of kinetic energy. That dissipation diminishes the resolution of turbulent processes, limiting the efficacy of these computational methods in compressible, multiphase applications that prominently feature turbulence, such as transonic atomization. While taking advantage of the benefits of geometric transport and pressure projection, we address and mitigate sources of numerical dissipation, employing a hybrid transport scheme and a modified pressure implementation. Using simulations of droplets in turbulence, we quantify the influence of these aspects of the flow solver and evaluate the scheme by comparing with results from the literature. Finally, we demonstrate the capability of our scheme in simulating transonic atomization.

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