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Forcing in DNS of Isotropic Turbulence and its Effects on Closure Model for the Diffusion Current of High-Inertia Particle Pairs SARMA RANI, University of Alabama in Huntsville, DONALD KOCH, Cornell University — We developed a closure approximation for the phase-space diffusion current in the probability density function kinetic equation for monodisperse, high-Stokes-number particle pairs. We investigate the effects of the nature of forcing on the Eulerian two-time correlations of fluid relative velocities computed through DNS of isotropic turbulence. Two forcing schemes, deterministic and stochastic, were employed in the DNS runs. In the stochastic scheme, one also needs to specify the correlation time scale T_f of the Uhlenbeck-Ornstein (UO) processes that constitute the forcing. DNS runs based on the stochastic forcing were undertaken for five values of $T_f = T_E/4,\ T_E/2,\ T_E,\ 2T_E$, and $4T_E$, where T_E is the large-eddy time scale obtained from the DNS run with deterministic forcing. At $Re_\lambda \approx 80$ and 210, the Eulerian two-time correlation of fluid relative velocities seen by the stationary particles were computed. It is seen that the correlations obtained from the deterministic-forcing DNS runs were higher than those from the stochastic-forcing runs, the differences being substantially more pronounced at larger separations and for higher Re_λ.

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