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Intermittency of Acceleration in Second-Order Stochastic Lagrangian Models[1] ANDREA G. LAMORGESE, Cornell University, P.K. YEUNG, Georgia Institute of Technology, STEPHEN B. POPE, Cornell University — Accounting for intermittency of dissipation has been shown useful in the stochastic Lagrangian modelling of fluid particle accelerations in high Reynolds number, stationary isotropic turbulence (A.M. Reynolds, *Phys. Rev. Lett.* **91**(8), 084503 (2003)). We have identified a class of Markovian stochastic models (conditional on a log-normal representation for the pseudo-dissipation) that are exactly consistent with Gaussian velocity statistics and conditionally-Gaussian acceleration statistics. One subclass of models is defined by Kolmogorov (1962) scaling of the conditional acceleration variance, with acceleration and the logarithm of pseudo-dissipation coupled via a cross-diffusion coefficient that is linear in acceleration. The Reynolds (2003) model belongs to this class. The stochastic model formulation allows for deviations from Kolmogorov (1962), as observed in DNS data on the conditional acceleration variance. Different specifications for a conditional velocity (or acceleration) timescale are investigated for the matching of conditional two-time acceleration and velocity auto- and cross-correlations from DNS up to 2048^3 modes. Such data support a representation of the logarithm of pseudo-dissipation as an Ornstein-Uhlenbeck process.

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