

Mireille Bossy - Long-range correlation modeling for Lagrangian transport in turbulence and application to reduced wind gust model

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The ability to model, simulate, and predict dispersed turbulent two-phase flows is crucial for various industrial and environmental applications. In this context, the development of stochastic Lagrangian models for particle phase tracking is closely linked with the development of reduced PDE models, such as URANS or LES methods used in various applications. These models, which neglect small scales, cannot account for the temporal and spatial correlations inherent to the structured motions present in turbulent flow.

An exemplary manifestation of such structured motions are wind gusts. Using this unsteady, near-wall phenomenon as a starting point, I will introduce stochastic reduced Lagrangian transport models, discuss their application to wind time series, and outline the approaches we are developing to better account for the correlations induced by turbulent structures in these reduced models.