

## **Kinetic Brownian motion on the diffeomorphism group of a closed Riemannian manifold**

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**Abstract.** We define and study a new model for random perturbations of fluid dynamics, namely kinetic Brownian motion on the diffeomorphism group of a general closed Riemannian manifold. Using rough paths techniques and extending the notion of stochastic development to the infinite-dimensional setting of Hilbertian manifolds, we rigorously establish that this model provides an interpolation between the hydrodynamic flow of a fluid and a Brownian-like flow.

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