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Kinetic Brownian motion in the diffeomorphism group

In its simplest instance, kinetic Brownian in Rd is a C1 random path (m_t, v_t) with unit velocity v_t a Brownian motion on the unit sphere run at speed $a > 0$. Properly time rescaled as a function of the parameter a, its position process converges to a Brownian motion in $\mathbb{R}^d$ as a tends to infinity. On the other side the motion converges to the straight line motion (= geodesic motion) when a goes to 0. Kinetic Brownian motion provides thus an interpolation between geodesic and Brownian flows in this setting. Think now about changing Rd for the diffeomorphism group of a fluid domain, with a *velocity vector* now a vector field on the domain. I will explain how one can prove in this setting an interpolation result similar to the previous one, giving an interpolation between Euler's equations of incompressible flows and a Brownian-like flow on the diffeomorphism group.
