Workshop on Stochastic Analysis

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Stochastic transport equation with Levy noise

Abstract

We study the stochastic transport equation with globally Holder continuous and bounded vector field driven by a non-degenerate pure-jump Lévy noise of stable type. Whereas the deterministic transport equation may lack uniqueness, we prove the existence and pathwise uniqueness of a weak solution in the presence of a multiplicative pure jump noise, under suitable assumptions. Notably, our results cover a broad range of parameters, including the supercritical regime where the driving noise exhibits notoriously weak regularization. A key step of our strategy is the development of a sharp diffeomorphism and new regularity results for the Jacobian determinant of the stochastic flow associated to its stochastic characteristic equation. This talk is based on a joint paper with E Priola, J Zhai and J Zhu.