Existence of densities for stochastic evolution equations driven by fractional Brownian motion

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In this talk, I will describe a version of Hörmander's theorem for a stochastic evolution equation driven by a trace-class fractional Brownian motion with Hurst exponent $\frac{1}{2} < H < 1$ and an analytic semigroup on a given separable Hilbert space. In contrast to the classical finite-dimensional case, the Jacobian operator in typical solutions of parabolic stochastic PDEs is not invertible which causes a severe difficulty in expressing the Malliavin matrix in terms of an adapted process. Under Hörmander's bracket condition on the vector fields and the additional assumption that the range of the semigroup is dense, we prove the law of finite-dimensional projections of such solutions has a density w.r.t Lebesgue measure. The argument is based on rough path techniques and a suitable analysis on the Gaussian space of the fractional Brownian motion. This is a joint work with Jorge Nascimento and it is based on the article [1].

References

[1] Nascimento, J. and Ohashi, A *Existence of densities for stochastic evolution equations driven by fractional Brownian motion*,online at arxiv.org and submitted (2019).