Strong uniqueness for SDEs in Hilbert spaces with non-regular drift

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The talk is based on the joint work with Giuseppe Da Prato, Franco Flandoli and Alexander Veretennikov.

Session: 34. SPDE: stochastic analysis and dynamics

We prove pathwise uniqueness for a class of stochastic differential equations (SDE) on a Hilbert space with cylindrical Wiener noise, whose non-linear drift parts are sums of the subdifferential of a convex function and a bounded part. This generalizes a classical result by one of the authors to infinite dimensions. Our results also generalize and improve recent results by N. Champagnat and P. E. Jabin, proved in finite dimensions, in the case where their diffusion matrix is constant and non-degenerate and their weakly differentiable drift is the (weak) gradient of a convex function. We also prove weak existence, hence obtain unique strong solutions by the Yamada-Watanabe theorem. The proofs are based in part on a recent maximal regularity result in infinite dimensions, the theory of quasi-regular Dirichlet forms and an infinite dimensional version of a Zvonkin-type transformation. As a main application we show pathwise uniqueness for stochastic reaction diffusion equations perturbed by a Borel measurable bounded drift. Hence such SDE have a unique strong solution.