

# Parabolic SPDEs in critical spaces

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Critical spaces for nonlinear PDEs are important due to scaling invariance, and in particular this plays a central role in fluid dynamics. In this talk we introduce and discuss local/global well-posedness and blow-up criteria for stochastic partial differential equations (SPDEs) in critical spaces. Our results extend the celebrated theory of Prüss, Wilke and Simonett for deterministic PDEs. Due to the presence of noise it is unclear that a stochastic version of the theory is possible but, as we will show, a suitable variation of the theory remains valid. We will also explain several features which are new in both the deterministic and stochastic framework. In particular, we discuss a new bootstrap method to prove regularization of solutions to (S)PDEs, which can also be applied in critical situations. If time allows, then I will discuss applications to stochastic reaction-diffusion equations and stochastic Navier-Stokes equations with transport noise.

This is a joint work with Mark Veraar (TU Delft).