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Stochastic PDEs with the compact support property: the stable noise regime

A solution to the heat equation with non-negative, non-zero initial data is strictly positive. This property generalizes to most parabolic PDEs, but not necessarily to stochastic PDEs. The solution to a heat equation with multiplicative noise may be a compactly supported function, depending on the regularity of the noise coefficient. I will first discuss some classical theorems of this type when the equation has white Gaussian noise, and then discuss a recent result which proves the compact support property for solutions to a class of stochastic heat equations with white stable noise. Along the way we will develop some heuristics for why this property holds, sketch some proof techniques, and discuss connections with superprocesses.