Chandra, Ajay; Shen, Hao
Moment bounds for SPDEs with non-Gaussian fields and application to the Wong-Zakai problem. (English) Zbl 1379.60064
Electron. J. Probab. 22, Paper No. 68, 32 p. (2017).

Summary: Upon its inception, the theory of regularity structures [M. Hairer, Invent. Math. 198, No. 2, 269–504 (2014; Zbl 1332.60093)] allowed for the treatment for many semilinear perturbations of the stochastic heat equation driven by space-time white noise. When the driving noise is non-Gaussian the machinery of the theory can still be used but must be combined with an infinite number of stochastic estimates in order to compensate for the loss of hypercontractivity, as was done in [M. Hairer and H. Shen, Ann. Probab. 45, No. 6B, 4167–4221 (2017; Zbl 1388.60111)]. In this paper we obtain a more streamlined and automatic set of criteria implying these estimates which facilitates the treatment of some other problems including non-Gaussian noise such as some general phase coexistence models [M. Hairer and W. Xu, “Large-scale behavior of three-dimensional continuous phase coexistence models”, Commun. Pure Appl. Math. 78, No. 4, 688–746 (2018; doi:10.1002/cpa.21738); the second author and W. Xu, “Weak universality of dynamical \( \Phi^4_3 \): non-Gaussian noise”, Stoch. Partial Differ. Equ., Anal. Comput. (to appear), doi:10.1007/s40072-017-0107-4)] – as an example, we prove here a generalization of the Wong-Zakai Theorem found in [M. Hairer and É. Pardoux, J. Math. Soc. Japan 67, No. 4, 1551–1604 (2015; Zbl 1341.60062)].

MSC:
60H15 Stochastic partial differential equations (aspects of stochastic analysis)

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