

Dissipation in Parabolic SPDEs

Shang-Yuan SHIU *National Central University, Taiwan*, E-mail: shiu@math.ncu.edu.tw

KEY WORDS: Dissipation, PAM, SHE

MATHEMATICAL SUBJECT CLASSIFICATION: 60H15

Abstract: We consider the following stochastic heat equation (SHE)

$$\frac{\partial}{\partial t} u(t, x) = \Delta u(t, x) + \lambda \sigma(u(t, x)) \frac{\partial^2}{\partial t \partial x} \xi(t, x), \quad x \in [-1, 1]$$

with the periodic boundary condition and the initial data is a constant. Kim and Khoshnevisan [2] and Foondun and Joseph [1] proved that the second moment of the solution $u(t, x)$ grows like $\exp(\lambda^4 t)$ as λ goes to ∞ . However, we [3] can show that $\sup_{x \in [0, 1]} u(t, x)$ converges to 0 in probability as λ goes to ∞ . When λ is fixed, we show that $\sup_{x \in [-1, 1]} u(t, x)$ converges to 0 a.s. when t goes to ∞ . All together really says the solution is really intermittent. This is joint work with Kunwoo Kim, Davar Khoshnevisan and Carl Mueller.

References

- [1] M. Foondun & M. Joseph (2014). Remarks on non-linear noise excitability of some stochastic heat equations, *Stochastic Processes and their Applications*, **124**, 3429–3440.
- [2] K. Kim & D. Khoshnevisan (2015). Non-linear excitation and intermittency under high disorder, *Proc. Amer. Math. Soc.*, **143**, 4073–4083.
- [3] K. Kim, D. Khoshnevisan, C. Mueller & S.-Y. Shiu. Dissipation in parabolic SPDEs, preprint.