

# Generation and motion of interface for 1-dimensional stochastic Allen-Cahn equations

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In this work we calculate the generation time of the interface for the stochastic Allen-Cahn equation,

$$\begin{cases} \dot{u}^\varepsilon(t, x) &= \Delta u^\varepsilon(t, x) + \frac{1}{\varepsilon} f(u^\varepsilon(t, x)) + \dot{W}_t^\varepsilon(x), \quad t > 0, \quad x \in \mathbb{R}, \\ u^\varepsilon(0, x) &= u_0^\varepsilon(x), \quad x \in \mathbb{R}, \end{cases}$$

and connect to the motion of interface which is a work of T. Funaki in [1]. We prove that the interface is generated by the time of order  $O(\varepsilon |\log \varepsilon|)$  and the generated interface moves in the time scale of order  $O(\varepsilon^{-2\gamma-1})$ . We prove these results in the case of  $W_t^\varepsilon(x) := \varepsilon^\gamma W_t(x)$  where  $W_t(x)$  is the  $Q$ -Brownian motion which is smooth in  $x \in \mathbb{R}$ . In the process of this work, we extend the comparison theorem for PDE to SPDE's. If we have more time, we want to talk about the case that  $W_t(x)$  is a space-time white noise with which we cope now.

## References

- [1] T. Funaki, *The scaling limit for a stochastic PDE and the separation of phases*, Probab. Theory Related Fields, **102** (1995), no. 2, 221-288.