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The most effective model for describing the universal behavior of unstable surface growth

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概　要

Anomalous transportation is characterized by a scale dependent transportation coefficient. It has been conjectured that such behavior is effectively described by a stochastic model. However, the parameter values of the model are determined only by measurements, and it is not established to connect the parameter value of such effective models with microscopic descriptions. It may be obvious that this can be studied by the renormalization group (RG) method. However, standard RG analysis, in which a fixed point and scaling exponents are studied, cannot determine the effective model for scale-dependent parameters.

In this talk, we propose a new theoretical framework to determine parameter values of an effective stochastic model for anomalous transportation [1]. We discuss that the model is determined by identifying "a specific trajectory" of solutions of the RG equation. The trajectory represents the minimum flow from an effective model to an infrared universal behavior. Specifically, we determine the Kardar-Parisi-Zhang equation that effectively describes the universal behavior of the Kuramoto-Sivashinsky equation. Furthermore, we discuss an application of our theory to other systems that have anomalous transportation.

Reference:
[1] Y. Minami, S. Sasa, arXiv:1703.08946 [cond-mat.stat-mech].

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