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THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

MATHEMATICS COLLOQUIUM

Random surface growth, KPZ scaling and stochastic Burgers

By

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Abstract

The growth of random surfaces is a ubiquitous phenomenon in nature and has attracted attention of many physicists and mathematicians. Many probabilistic models for such phenomena are believed to belong to the KPZ (Kardar--Parisi--Zhang) universality class, including the KPZ equation, first-/last-passage percolation, directed polymers and so on. One unique feature of the KPZ models is the 1:2:3 scaling, which is quite different from the Gaussian 1/2 exponent and is confirmed rigorously by the study of exactly solvable models. The KPZ scaling can also be understood via the large-scale behavior of minimizers and polymer measures in random environments.

The stochastic Burgers equation (and more general Hamilton--Jacobi equations) is a KPZ model which bridges many research areas. The variational or stochastic control representation of the solutions can be interpreted as LPP or directed polymer models. The large-time limits of the minimizers and polymer measures are related to the invariant measures of the stochastic PDE, which is an important question on its own. Common features shared by the Burgers, the minimizers and the polymer measures such as monotonicity and contraction, should help us better understand the KPZ scaling and universality.

Date : 3 November 2023 (Fri)

Time : 3:00pm – 4:00pm

Venue : Lecture Theater F (Lifts 25/26)

All Are Welcome!