

# REPLICA ANALYSIS OF THE ONE-DIMENSIONAL STATIONARY KARDAR-PARISI-ZHANG EQUATION

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The Kardar-Parisi-Zhang (KPZ) equation is a prototypical equation for the surface growth phenomena. It describes the universal aspects of the surface fluctuation and is also related to various systems in nonequilibrium statistical mechanics (Burgers turbulence, directed polymers, etc). Recently, the one-dimensional KPZ equation has attracted much attention in mathematical physics. Since the discovery of an exact solution for the height distribution by Sasamoto-Spohn and Amir-Corwin-Quastel, we have found many important developments including deep connections to Macdonald processes, geometric RSK and Quantum Toda lattice studied by Borodin, Corwin, O'Connell et al. In this talk, I present our recent result (arXiv:1111.4634) on the first exact solution for the height distribution and two-point correlation function of the KPZ equation in the stationary case. So far all known results described transient (non-stationary) property, although the stationary state is a most fundamental situation in statistical mechanics. Our analysis is based on the replica approach developed by Kardar, Dotsenko and Calabrese-Le Doussal-Rosso, in which we utilize a remarkable connection of the KPZ equation with the quantum attractive delta Bose gas system. This is a joint work with Tomohiro Sasamoto.