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From KPZ to Inviscid Burgers universality : a FRG approach

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In one dimension, the stochastic Burgers' equation, describing a randomly forced viscous fluid, can be obtained from the Kardar-Parisi-Zhang (KPZ) equation for a stochastically growing interface through an exact mapping. Since its introduction, the KPZ equation has been studied broadly, and found to successfully describe the universal dynamics of a wide range of systems out of equilibrium, from classical interfaces to driven dissipative polariton condensates. In 1D, the rough KPZ interface is described by a fully attractive fixed-point corresponding to a finite value of its non-linear coupling g. In a recent numerical work, a crossover to a different dynamical regime with different scaling exponents has been found from numerical simulations of the stochastic Burgers equation, in the limit of zero viscosity. This limit corresponds in the KPZ equation to the limit of infinite g, which has not been explored so far. In this work, we present a FRG approach to this regime, revealing a new universal behaviour.

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