

Workshop on Integrability



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Integrable matrix models in discrete space-time: A paradigm of Kardar-Parisi-Zhang physics

Wednesday, 30 March 2022 14:00 (1 hour)

I will discuss a class of very simple integrable dynamics on a discrete space-time lattice, which is generated by a 2-site matrix-valued rational map.

The phase spaces of the matrix variable can be selected from diverse families of symmetric spaces, e.g. complex Grassmannians, and are equipped with a natural symplectic structure.

This precise form of the map follows from a simple consistency condition for a parallel transport (aka Lax zero curvature condition) on a space-time lattice using a minimalistic Lax operator, which is linear in the spectral and matrix variables. I will discuss the Yang-Baxter property and conservation laws of these maps.

Physically, the model represents an integrable discretization and $SU(N)$ generalization of Landau-Lifshitz magnet. Using numerical computations, we have demonstrated that the transport of Noether charges follows Kardar-Parisi-Zhang universality with superdiffusive dynamical exponent $3/2$. Most interesting open questions will be discussed.

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