

Workshop on Integrability



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Type: 40 Min Talk

Anomalous fluctuations in integrable systems

Tuesday, 29 March 2022 15:30 (1 hour)

We discuss anomalous fluctuations recently observed in the (anisotropic) Landau-Lifshitz model in equilibrium, a paradigmatic integrable model of interacting classical spins. Typical fluctuations of the time-integrated spin current on sub-ballistic scales are non-Gaussian and the cumulants are found to grow with different (algebraic) exponents, unlike in the “standard” scenario of the theory of large deviations, where the existence of a scaled cumulant generating functions implies finite scaled cumulants.

Similar phenomenology is observed in a simple interacting cellular automaton, where an analytical computation of the full counting statistics is feasible. Asymptotic analysis of the exact solution gives access to the current distribution on all scales and explicit cumulant asymptotics. The scaled cumulant generating function does not generate scaled cumulants. Our findings hint at novel types of dynamical universality classes in deterministic many-body systems.

1. Ž. Krajnik, E. Ilievski, T. Prosen, *Absence of Normal Fluctuations in an Integrable Magnet*, arXiv:2109.13088 (2021)
2. Ž. Krajnik, J. Schmidt, V. Pasquier, E. Ilievski, T. Prosen, *Exact anomalous current fluctuations in a deterministic interacting model*, arXiv:2201.05126 (2022)

Primary author: KRAJNIK, Žiga (University of Ljubljana)

Presenter: KRAJNIK, Žiga (University of Ljubljana)

Track Classification: Participants Talks: Abstracts of Participants Talks