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Superdiffusion and non-KPZ fluctuations in chiral SU(2) systems

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Symmetries play a crucial role in shaping transport in quantum many-body systems, often leading to departures from conventional diffusion. In this talk, I will discuss transport at infinite temperature in chiral integrable systems with global SU(2) symmetry. We study both Hamiltonian and Floquet (circuit) realizations, finding the dynamics exhibit a dynamical exponent $z=3/2$, consistent with superdiffusion in the Kardar–Parisi–Zhang (KPZ) universality class. However, as in the isotropic XXX model, an analysis of higher-order fluctuations – specifically the excess kurtosis – reveals clear deviations from KPZ scaling, signaling anomalous behavior beyond this universality.

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