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**RELAXATION, PRE-THERMALIZATION AND DIFFUSION IN A
NOISY QUANTUM ISING CHAIN**

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Abstract:

We study the dynamics of thermalization resulting from a time-dependent noise in a Quantum Ising Chain subject to a sudden quench of the transverse magnetic field. For weak noise the dynamics shows a pre-thermalized state at intermediate time scales, eventually drifting towards an asymptotic infinite temperature steady state characterized by diffusive behavior. By computing analytically the density of kinks, as well as the transverse and longitudinal magnetic field correlators, we characterize these two regimes, their observability and their signatures in the various physical quantities.