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Spreading of correlations in the XXZ chain at finite temperatures LARS BONNES, ANDREAS LAUCHLI, University of Innsbruck — In a quantum quench, for instance by abruptly changing the interaction parameter in a spin chain, correlations can spread across the system but have to obey a speed limit set by the Lieb-Robinson bound. This results into a causal structure where the propagation front resembles a light-cone. One can ask how fast a correlation front actually propagates and how its velocity depends on the nature of the quench. This question is addressed by performing global quenches in the XXZ chain initially prepared in a finite-temperature state using minimally entangled typical thermal states (METTS). We provide numerical evidence that the spreading velocity of the spin correlation functions for the quench into the gapless phase is solely determined by the value of the final interaction and the amount of excess energy of the system. This is quite surprising as the XXZ model is integrable and its dynamics is constrained by a large amount of conserved quantities. In particular, the spreading velocity seems to interpolate linearly from a universal value at $T = \infty$ to the spin wave velocity of the final Hamiltonian in the limit of zero excess energy for $\Delta_{\text{final}} > 0$.

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