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Adiabatic dynamics in a spin-1 chain with uniaxial single-spin anisotropy

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We study the adiabatic quantum dynamics of an anisotropic spin-1 XY chain across a second order quantum phase transition. The system is driven out of equilibrium by performing a quench on the uniaxial single-spin anisotropy, that is supposed to vary linearly in time. We show that, for sufficiently large system sizes, the excess energy after the quench admits a non trivial scaling behavior that is not predictable by standard Kibble-Zurek arguments for isolated critical points or extended critical regions. This emerges from a competing effect of many accessible low-lying excited states, inside the whole continuous line of critical points.

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