

Plenary Talk

PV XVI Fri 8:15 U Audimax

Universal dynamics far from equilibrium — ●JÖRG SCHMIED-MAYER — Vienna Center for Quantum Science and Technology, Atom-institut, TU-Wien

We provide experimental evidence of universal dynamics far from equilibrium during the relaxation of an isolated one-dimensional Bose gas. Following a rapid cooling quench, the system exhibits universal scaling in time and space, associated with the approach of a non-thermal fixed point. The time evolution within the scaling period is described by a single universal function and scaling exponent, independent of the species of the initial state. Our results provide a quantum simulation in

a regime, where to date no theoretical predictions are available. This constitutes a crucial step in the verification of universality far from equilibrium. If successful, this will lead to a comprehensive classification of systems far from equilibrium based on their universal properties similar to the universality classes in phase transitions. This can be the basis for a new type of quantum simulation that let us explore a large variety of systems at different scales.

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S. Erne et al. Nature **253**, 225 (2018) arXiv:1805.12310.

For a similar experiment in a spin system see: M. Prüfer et al. Nature **253**, 217 (2018) arXiv:1805.11881