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Non-Equilibrium Dynamics of 1d Bose Gases Studied via Noise Distributions[1] MICHAEL GRING, MAXIMILIAN KUHNERT, TIM LANGEN, DAVID A. SMITH, Atominstitut, TU-Wien, TAKUYA KITAGAWA, EUGENE DEMLER, Harvard University, JOERG SCHMIEDMAYER, Atominstitut, TU-Wien — Understanding the dynamics of non-equilibrium many-body quantum systems is crucial for many areas in physics. However, due to the many degrees of freedom involved, characterising the dynamics is not an easy task. Here we present a first test of the use of noise distributions to analyse the evolution of a non-equilibrium many-body quantum system. The system under investigation is a coherently split 1d Bose gas. Repeated realizations of the experiment give us access to the noise distributions of the shot to shot variation of the interference pattern for different evolution times. By mapping out these distributions at different length scales, we demonstrate that the multimode character and enhanced role of fluctuations in 1d systems play a dramatic role in the resultant non-equilibrium dynamics.

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