

Quantum simulation of effective field theories using one-dimensional Bose gases

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Ultra-cold quantum gases are reliable analog quantum simulators, as they are highly tunable and well isolated from their environment. Here, I will present the quantum field simulation of the Klein-Gordon model using a pair of quasi-one-dimensional tunneling-coupled Bose gases on an atom chip. After briefly introducing our atom chip experiment and the theoretical framework, I will discuss measuring the von Neumann entropy in the experiment and verifying the area law of quantum mutual information [1]. Then, I will explain the post-quench propagation of information on a simulated inhomogeneous metric, where we observe the dynamics of correlations on curved light cones [2].

References

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