universität innsbruck

Department of Theoretical Physics

Seminar Talk

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"Quantum non-Gaussian coherence in bosonic systems"

Abstract

Understanding and controlling quantum coherence is a crucial prerequisite for realizing quantum information processing and error correction. Achieving these goals requires access to advanced quantum resources reaching a highly nonclassical regime. The quantum non-Gaussianity has emerged as a valuable framework for certifying this regime and has been employed for hierarchical benchmarking of Fock states where higher Fock states are favoured over lower ones. We advance this evaluation by specifying a task in which the quantum coherence represents a figure-of-merit rather than achieving a high Fock state. We study scenarios when quantum coherence outperforms coherence generated by Gaussian processes acting on specific free states, which fail in the considered task. We propose a hierarchy that classifies a degree of the quantum non-Gaussian coherence and tests the feasibility of the respective criteria by applying them to state-of-the-art photonic states. Our results certify that the experimentally generated states overcome the limits of the coherence reached by Gaussian evolution of any Fock state.

Tuesday | 29.04.2025 | 11am

2S17 | ICT building