RIKEN QUANTUM COMPUTING

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37th RQC Colloquium

Quantum non-Gaussianity

Prof. Radim Filip

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Sep 10, 2025(Wed) **16:00–17:00**(JST)

This colloquium will be held in **HYBRID format**.

On-site Venue: Wako C00 HQ 2F Large Meeting Room

Online Venue: Zoom. To receive the link, register in advance at https://krs2.riken.jp/m/rqc_registration_form

Quantum non-Gaussian states are critical indicators of nonlinearities that influence quantum noise and are a key resource in quantum technology involving bosonic systems. They already have proven applications in quantum sensing and quantum error correction protocols, which are crucial for quantum computing. The presentation will provide an overview of ongoing activities, review recent theoretical techniques, and showcase related experimental results. These advancements have enhanced our ability to certify, understand, control, and utilise quantum non-Gaussian states across optical, microwave, and mechanical platforms, generated from genuine quantum nonlinearities in oscillator dynamics or measurements. Although this field is becoming increasingly attractive, it also presents significant theoretical and experimental challenges. We will highlight recent successes alongside current difficulties. The presentation will conclude with a review of future challenges in both theory and practice, focusing on genuine quantum nonlinear interactions of light and microwaves with atoms, mechanical oscillators, and superconducting circuits, to foster discussion, collaboration, and further progress in this promising area.