

# Infinite Mode Quantum Gaussian States

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## Abstract

Quantum Gaussian states on Bosonic Fock spaces are quantum versions of Gaussian distributions. A systematic study of the quantum Gaussian states in the infinite mode setting is initiated in this work. This naturally leads to Type I quasifree states on  $CCR$ -algebra and Hilbert-Schmidt, Trace class restrictions on the covariance operators. We characterize the quantum Gaussian states using the properties on covariance operators and extend many of the results of Parthasarathy [1] and [2] to the infinite mode case. This include various characterizations, convexity and symmetry properties. This is a joint work with B. V. Rajarama Bhat and R. Srinivasan.

- [1] K. R. Parthasarathy, *What is a Gaussian state?*, Commun. Stoch. Anal. **4** (2010), no 2, 143-160, MR 2662722.
- [2] K. R. Parthasarathy, *The symmetry group of Gaussian states* in  $L^2(\mathbb{R}^n)$ , Prokhorov and contemporary probability theory, vol. 33, Springer, Heidelberg, 2013, pp. 349–369, MR 3070484