# Highly non-Gaussian quantum physics

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The talk will report about recent theoretical and experimental achievements opening the door to highly non-Gaussian quantum physics with light and mechanical oscillators. This territory is challenging for investigation, both theoretically and experimentally. After a brief introduction to the quantum non-Gaussian effects, we will present recent theoretical and experimental activities including the faithful loss-tolerant hierarchy of quantum non-Gaussianity for multiphonon generation and its experimental verification, recent experimental result on the generation and accumulation of quantum non-Gaussianity of single-atom mechanical oscillators and preparation of highly non-Gaussian GKP states of single-atom mechanical systems and superconducting circuits. The talk will conclude with other related results and the next challenges in theory and experiments with light, mechanical oscillators and superconducting circuits to stimulate discussion and further development of this field.