



Contribution ID: 11

Type: Oral

Nonclassical steering and the Gaussian steering triangoloids

Friday, 2 October 2020 14:30 (15 minutes)

We fully characterize the mechanism by which nonclassicality according to the Glauber P-function can be conditionally generated on one mode of a two-mode Gaussian quantum state by generic Gaussian measurements on the other mode. For two-mode squeezed thermal states (TMSTs), we visualize the whole set of conditional states constructing Gaussian steering triangoloids and we show that nonclassicality can be induced in this way if and only if the initial state is EPR-steerable. In the more general case, we recognize two types of quantum correlations: weak and strong nonclassical steering, the former being independent of entanglement, and the latter implying EPR steerability. We show that EPR-steering and weak/strong nonclassical steering merge precisely for TMSTs, and we discuss applications of this result to one-sided device-independent quantum key distribution and noisy propagation of twin-beam states.

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Session Classification: Invited