

Joint CQSE and CASTS Seminar

2019

May. 3, Friday

TIME May. 3, 2019, 14:30 ~ 15:30
TITLE Process nonclassicality: Characterization, canonical Hamiltonian ensemble representation, and quantification.
SPEAKER Dr. Hong-Bin Chen
Department of Physics, National Cheng Kung University
PLACE Rm716, CCMS & New Physics Building, NTU

Abstract

The characterization, explanation, and quantification of quantumness, in particular the discrimination from classicality in terms of classical strategies, lie at the heart of quantum physics. Recently, it is shown that dynamical processes can exhibit classical or nonclassical traits, depending on the nature of the system-environment correlations and the related (im)possibility to simulate these dynamics with Hamiltonian ensembles—the classical strategy. Here we propose to extend this classification towards *quantifying* the nonclassicality. In the spirit of Wigner function, we generalize Hamiltonian ensembles to encompass quasi-probability distributions comprising negative values. Based on Lie algebra representations, Fourier transforms on groups, and root space decompositions, we demonstrate that quasi-probability distributions are faithful representations. This allows us to quantify process-nonclassicality time-independently, in terms of the deviations of the corresponding quasi-probability distributions from legitimate (non-negative) probability distributions.

