BENEMÉRITA UNIVERSIDAD AUTÓNOMA DE PUEBLA
INSTITUTO DE FÍSICA
"Ing. Luis Rivera Terrazas"

SEMINARIO SEMANAL
"Jesús Reyes Corona"

"Detection of typical bipartite quantum correlations by local generalized measurements"

Dr. Gernot Alber

Professor

Institut für Angewandte Physik, Technische Universiät Darmstadt, Darmstadt

Detection of genuine quantum correlations, such as entanglement or steerability, by quantum measurements, which can possibly be performed locally by far distant observers, are of particular interest for applications in quantum information processing, in particular for quantum key distribution and quantum communication. In this context the natural question arises how does the effectiveness of detecting such genuine quantum correlations depend on the nature of local quantum measurements and on the dimensionality of the quantum systems involved for typical, randomly selected quantum states. In this talk current activities are discussed which address this question. In particular, recent results are presented which address this question by exploring basic properties of commonly used sufficient conditions for entanglement- and steerability-detection of arbitrary dimensional bipartite quantum systems based on correlation matrices and joint probability distributions. In order to explore characteristic features of their dependence on the nature of the local quantum measurements generalized quantum measurements based on informationally complete positive operator valued measures(POVMs) of the so called (N,M)- type are discussed. These recently introduced (N,M)-POVMs are capable of describing various important generalized quantum measurements in a unified way, including mutually unbiased measurements and symmetric informationally complete measurements and their generalizations. It turns out that symmetry properties of (N,M)-POVMs imply that sufficient conditions for bipartite entanglement- or steerability-detection exhibit characteristic scaling properties which relate different equally efficient local quantum correlation detection scenarios. In order to access the effectiveness of local entanglement- or steerability-detection for bipartite quantum states of different dimensions numerical results on Euclidean volume ratios between locally detectable entangled or steerable states and all bipartite quantum states are presented, which are based on a recently developed hit-and-run Monte-Carlo algorithm

Auditorio del Instituto
Viernes 20 de octubre de 2023
13:00 hrs