# Duality of Entanglement and Positivity

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Abstract:

Subsequent to the preparations of the former part, in this talk a duality picture between the subjects of positive maps and quantum entanglement will be illustrated, which is literally the major issue of the whole presentation. With this duality, we will prove the equivalences of several inquiries over the two sides, and, most importantly, will introduce a scheme to fully, i.e., necessarily and sufficiently, determine the entanglement (or separability) of a quantum mixture and the positivity of a superoperator. Noteworthily, the computational complexity of deciding the separability or the positivity via the scheme is polynomially bounded by the system dimension. This learning may imply the merit of various applications that the duality picture has revealed attainable routes to measures of entanglement and positivity exhibited in a Hilbert space of an arbitrary finite dimension.