

# QUANTUM INFORMATION PROCESSING AND ENTANGLEMENT

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It has been recognized that *quantum entanglement* is the main physical resource of quantum communication processing, including quantum cryptography, and quantum computing [1,2]. In particular, *quantum teleportation* is based on the use of entangled states. In the usual treatment, entanglement is considered to be a manifestation of quantum correlations that have no classical analog. Such a definition is intuitive and more philosophical than physical or mathematical. We examine properties of entangled states in the systems of *qubits*, *qutrits*, etc., and show that physically the notion of entanglement can be associated with the amount of quantum fluctuations of physical observables in a given state [3,4]. This picture leads to a variational principle for *maximum entanglement* [5]. As a corollary of this principle, we consider physical processes leading to the *stabilization* of entanglement in physical systems (preparing robust entangled states for quantum communication processing and quantum computing) [6,7].

## **References**

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