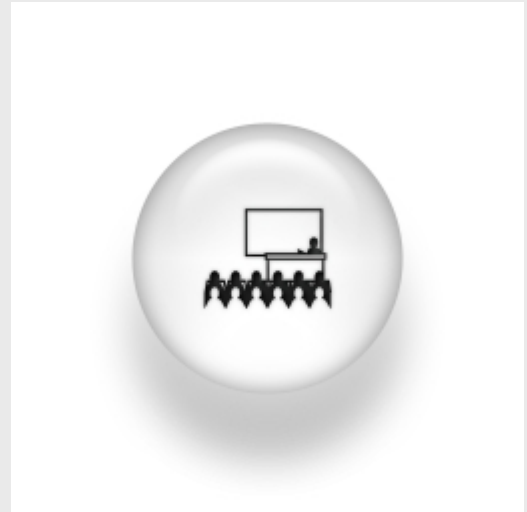


Quantum Entanglement in Many Body Systems

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ABSTRACT:

The most fundamental property that distinguishes the classical world from the quantum world is entanglement. This fact has been known since the old days of Quantum Mechanics, as exemplified by the EPR paradox. More recently, it has been recognized that entanglement is the main source for quantum information allowing for teleportation and quantum computation. On the other hand, entanglement is also a fundamental property in many body systems in Condensed Matter and Quantum Field Theory. This is reflected in the area law satisfied by entanglement entropy of the low energy states of these systems. This area law is at the basis of some numerical methods in low dimensional systems such as the DMRG, MPS, PEPS, etc. In this talk we shall give an introduction to these topics.