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Thesis Title	*Criteria of quantum correlations for bipartite states*
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Summary	In the presented thesis we make a detailed review on the nature of quantum correlations, and especially of entanglement, in the way they manifest in arbitrary bipartite states. In the first part, we construct appropriate functions as measures of entanglement, while we study in detail one of them, namely the Concurrence, which emerges from the study of the Von-Neumann entropy. Later on, we define Quantum Discord, which is constructed from the redefining of the conditional probability for quantum systems, and we study its properties. On the last part, to study the way Concurrence and Quantum Discord behave, we apply our results on a bipartite system of two correlated two-leveled atoms bathed in an electromagnetic cavity, for which system the interaction is described by the Hamiltonian of the Jaynes-Cummings model.
Key words	entanglement, entropy, quantum discord, concurrence
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