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Title: Entanglement and Non-Locality in Continuous Variable System

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Abstract: Entanglement and Nonlocality play a very important role in Quantum Information. Recently, a lot of focus has shifted to Continuous Variable Quantum Information, mainly because, continuous variable systems like coherent and squeezed state of light are easier to produce and do experiments with. In my thesis, I initially looked upon the separability criterion of bipartite Gaussian States. Then, I explored the nonlocality of a given general bipartite Gaussian state. To examine the nonlocality of a continuous variable state, a continuous variable Bell-type inequality is required. I used two such inequalities for my study and tried to compare them. I also introduced noise in this study of nonlocality of Gaussian states. The main reason was that in real experiments noise is very important. I introduced two types of noise in the inequality. One in the form of thermal noise and other by using a beam splitter model. Using these two models of noise, I explored how noise would affect the nonlocality of a state and obtained some results.

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