Title:	Discrimination of multi-photon entangled states using liner optics
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Abstract:	In this thesis, we study the the discrimination of orthogonal multi-photon entangled states using linear optical setups. Beginning with the Bell states, we motivate Bell State Measurements (BSMs) by describing protocols in quantum information theory where they form an integral step. We then review a no-go theorem regarding the pos sibility of complete BSMs using linear optics, and a result placing a bound on the success probability of discrimination using a restricted linear optical setup containing no ancillaries. We describe and compare various resources proposed in literature that can be used to enhance the success probabilities of BSMs (ancillary entanglement, hy perentanglement, gaussian squeezing, and non-linear optical elements), and study their applications to quantum information protocols. Next, we study distinguishing between two-photon Non-Maximally Entangled (NME) states and the three-photon GHZ states using ancillary entanglement. For a specific setup with one ancillary entangled pair, we find that the NME states are harder to dis tinguish than the Bell states. Finally, we place upper bounds on the success probability of GHZ state discrimination using ancillary entanglement as a function of number of photons used, for polarization preserving setups.
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