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Purity and Dimensionality measurements using Werner States

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High dimensional entangled quantum systems are important in various applications such as quantum teleportation, secure quantum key distribution and cryptography. Such applications require a method to characterize the state density matrix. Conventional methods such as Quantum State Tomography work, however, can become computationally cumbersome if the dimension becomes too great. The method outlined, which is an extension of a proven method that uses isotropic states as model states, makes use of Werner states instead. Minimization techniques are used to extract key parameters that determine the state, rather than to necessarily reconstruct the state itself. Werner states are mixed entangled states and are good representations of bipartite quantum entangled systems. They consist of different weightings of projectors onto anti-symmetric and symmetric subspaces. The process involves using analyser matrices to probe Hilbert space. Chi-squared minimization using visibility calculations leads to the extraction of a symmetric weighting value and the dimensionality.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

Primary author: Mr SLABBERT, Donovan (University of Witwatersrand)

Co-authors: Mr NAPE, Isaac (University of Witwatersrand); Prof. FORBES, Andrew (University of Witwatersrand)

Presenters: Mr SLABBERT, Donovan (University of Witwatersrand); NEETHLING, Pieter (Laser Research Institute, University of Stellenbosch)

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