

Dynamical Quantum Search Noisy Algorithm

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Grover's algorithm finds optimally an marked item in a N dimensional unstructured quantum database after \sqrt{N} trials, while is classical rival requires N trials on the average. Dynamical modeling of external influences in the form of quantum noise on Grover's search algorithm are investigated [1, 2]. The study shows that the algorithm can be robust under such external dissipation. The effect of noise is described by a completely positive trace preserving map, acting on an unsorted N -dimensional database made of projective density matrices. To evaluate the efficiency of the algorithm two figures of merit are used, the radial fidelity giving the projection between the Bloch vectors of target and final density operators, and the cosine of angular fidelity between the same vectors. Information theoretic aspects of the dissipative quantum search dynamical algorithm are investigated [3].

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- [1] D. Ellinas and Ch. Konstadakis, " Noisy Grover's searching algorithm ", Proc. Int. Conf. of Quantum Information, ICQI-2001, to appear,(quant-ph/0110010).
 - [2] D. Ellinas and Ch. Konstadakis, " Quantum Noise and Informatioin Quantum Search Algorithm ", Quantum Communication Measurement and Computing, Eds. S.M. Barnett et. al AIP, vol. CP. 734, p.179 -182.
 - [3] D.Ellinas, to appear.