Approximate Quantum Algorithms as a Multiphoton Raman Exitation of a Quasicontinuum Edge

V M Akulin[1], A Mandilara[2], and D Fedotov[3]

[1] *Laboratroire Aime Cotton, Centre National de la Recherche Scientifique, Paris, France*
[2] *Informatics, National and Kapodistrian University of Athens, Athens, Greece*
[3] *Department of Mathematics and Electronics, Higher School of Economics, MIEM, Moscow, Russia*
Contact Email: akulinvladimir@gmail.com

Many of Quantum Algorithms are seen as a transition from a well-defined initial quantum state of a complex quantum system, to an unknown target quantum state, corresponding to a certain eigenvalue either of the Hamiltonian or of a transition operator. Often such a target state corrponds to minimum energy of a band of states. In this context, the approximate quantum calculations imply transition to a group of states close to the minimum. We consider dynamics and the result of two possible realization of such a processe – transition of population from a single initially populated isolated level to the quantum states at the edge of a band of levels. The first case deals with the time-independent Hamiltonian, while the other with the moving isolated level. We demonstrate that the energy width of the population energy distribution over the band corresponds by that, suggested by the time-energy uncertainty principle, although the specific shape of the distribution depends on the particular setting. We consider the role of the statistics of the coupling matrix elements between the isolated level and the band levels. As a physical realization, one may think about multiphoton Raman absorption by an ensemble of Rydberg atoms.