

Elementary Quantum Gates Based on Intrinsic Interaction Hamiltonian

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(Received: 2005-10-28; Revised: 2006-2-22)

Abstract: A kind of new operators, the generalized pseudo-spin operators are introduced and a universal intrinsic Hamiltonian of two-qubit interaction is studied in terms of the generalized pseudo-spin operators. A fundamental quantum gate $U(\theta)$ is constructed based on the universal Hamiltonian and shown that the roles of the new quantum gate $U(\theta)$ is equivalent, functionally, to the joint operation of Hadamard and C-Not gates.

PACS: 03.67.Lx, 32.80.Wr

Key words: quantum gate, intrinsic Hamiltonian

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