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Implement quantum search and quantum counting algorithms by geometric quantum computation QINGHUA ZHANG, Department of Physics, The University of Hong Kong, Pokfulam Road, Hong Kong, China, GUILU LONG, Department of Physics, Tsinghua University, Beijing 100084, China, ZIDAN WANG, Department of Physics, The University of Hong Kong, Pokfulam Road, Hong Kong, China — We derive the matching condition in the $SO(3)$ picture of the generalized Grover's quantum search algorithm. We also give a more concise formula for evaluating the number of the iterations needed in the searching. This will help us a lot in the operation and get the target with certainty easily. We propose a new adiabatic Abelian geometric quantum computation strategy to implement quantum search and quantum counting algorithms based on the non-degenerate energy eigenstates in superconducting phase-qubit systems.

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