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(54) **QUANTUM COMPUTATION DEVICE AND OPERATION THEREOF**

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(57) **ABSTRACT**

A method is provided, including: applying a magnetic field according to a two-qubit gate operation performed with a quantum device; transmitting a voltage signal to a gate structure, arranged above first and second quantum dots in the quantum device, to generate a coupling signal that includes a first sine squared wave; and performing, by the magnetic field and the coupling signal, the two-qubit gate operation to the first and second qubits in the first and second quantum dots.

