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Spintronic and quantum computation in quantum dot

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Recently, electronic spin transport, persistence and manipulation, as well as the interaction of electronic spins with optics, have the fundamental properties in nonmagnetic semiconductor materials. Two-qubit operations could be performed by controlling the exchange interaction between two quantum dots with electric gates, and spin detection could be obtained via ferromagnetic nucleation. By using spin in quantum dots, quantum computation possesses some complementary advantages to the ionic quantum computation approach defined above. The growth of quantum dots, often by strain-nucleated approaches or mesa lithography, authorized a selection of many physical properties, including confinement energy, overlap and g factors. Quantum dots can also be described by accumulation and depletion through gates in a two-dimensional electron gas. To appraise the potential success of proposals for quantum dot by quantum computation, it is first necessary to develop accurate methods of calculating the electronic structure of these quantum dots. We centralized on the material properties important for implementing quantum computation, and on the characteristics that may lead more rapidly to scalable solutions for quantum information processing. However, methods of initialization, manipulation, and detection of coherence in ionic degrees of freedom have recognized. It may permit highly uniform systems of physical qubits to be generated by using of ionic spins . Techniques for initializing and optically manipulating spins in quantum dots have offered, along with the physical origin of the Lande´ g factor in quantum dots. Some approaches started earlier, such as manipulation with the exchange interaction in lithographic quantum dots, are now making rapid progress. The seven years between the suggestion of a quantum dot architecture for a quantum computer and the successful observation of single-spin decoherence times in a quantum dot enables some indication of the potential time between suggestion and prosperous demonstration in the field of solid-state quantum computation.

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