

## Nanodevices for Quantum Computation

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Effects due to small numbers of dopants or even single charge carriers are becoming important with the continuous scaling-down of semiconductor devices. While undesired for more conventional electronics, such single electron effects can potentially be used to realize novel applications such as quantum computation. This talk will summarize recent developments in the theoretical and experimental study of few-donor devices and will briefly present the state-of-the-art of single-electron transistors. Special emphasis will be given to the spin degree of freedom, which becomes accessible in such devices, and the recent advances in the readout of spin states of electrostatically-defined quantum dots and of donors states. Finally, critical issues concerning the scaling-up of spin-based nanodevices will be discussed.