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Special Issue Reprint

Magnetic and Spin Devices

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Edited by
Viktor Sverdlov
Nuttachai Jutong

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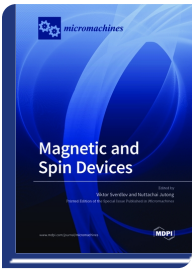

As the scaling of electronic semiconductor devices displays signs of saturation, the main focus of research in microelectronics is shifting towards finding new computing paradigms. Electron spin offers additional functionality to digital charge-based devices. Several fundamental problems, including spin injection to a semiconductor, spin propagation and relaxation, and spin manipulation by the gate voltage, have been successfully resolved to open a path towards spin-based reprogrammable electron switches. Devices employing electron spin are nonvolatile; they are able to preserve the stored information without external power. Emerging nonvolatile devices are electrically addressable, possess a simple structure, and offer endurance and speed superior to flash memory. Having nonvolatile memory very close to CMOS offers a prospect of data processing in the nonvolatile segment, where the same devices are used to store and process the information. This opens perspectives for conceptually new low-power computing paradigms within Artificial Intelligence of Things (AIoT). This Special Issue focuses on all topics related to spintronic devices such as spin-based switches, magnetoresistive memories, energy harvesting devices, and sensors that can be employed in in-memory computing concepts and in Artificial Intelligence.

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