Introduction to Spintronics

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Using spin to replace or augment the role of charge in signal processing devices, computing systems and circuits may improve speed, power consumption, and device density in some cases—making the study of spinone of the fastest-growing areas in micro- and nanoelectronics. With most of the literature on the subject still highly advanced and heavily theoretical, the demand for a practical introduction to the concepts relating to spin has only now been filled.

Explains effects such as giant magnetoresistance, the subject of the 2007 Nobel Prize in physics

Introduction to Spintronics is an accessible, organized, and progressive presentation of the quantum mechanical concept of spin. The authors build a foundation of principles and equations underlying the physics, transport, and dynamics of spin in solid state systems. They explain the use of spin for encoding qubits in quantum logic processors; clarify how spin-orbit interaction forms the basis for certain spin-based devices such as spintronic field effect transistors; and discuss the effects of magnetic fields on spin-based device performance.

Covers active hybrid spintronic devices, monolithic spintronic devices, passive spintronic devices, and devices based on the giant magnetoresistance effect

The final chapters introduce the burgeoning field of spin-based reversible logic gates, spintronic embodiments of quantum computers, and other topics in quantum mechanics that have applications in spintronics. An **Introduction to Spintronics** provides the knowledge and understanding of the field needed to conduct independent research in spintronics.

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Patricia Spear:

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