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Nota di contenuto	1. An Overview of Spintronics -- 2.Basic elements of Spintronics -- 3. Giant Magnetoresistance (GMR) -- 4. Tunneling Magnetoresistance (TMR) -- 5. Spin Transfer Torque.
Sommario/riassunto	This book highlights the overview of Spintronics, including What is Spintronics ?; Why Do We Need Spintronics ?; Comparative merit-demerit of Spintronics and Electronics ; Research Efforts put on Spintronics ; Quantum Mechanics of Spin; Dynamics of magnetic moments : Landau-Lifshitz-Gilbert Equation; Spin-Dependent Band Gap in Ferromagnetic Materials; Functionality of ‘Spin’ in Spintronics; Different Branches of Spintronics etc. Some important notions on basic elements of Spintronics are discussed here, such as – Spin Polarization, Spin Filter Effect, Spin Generation and Injection, Spin Accumulation, Different kinds of Spin Relaxation Phenomena, Spin Valve, Spin

Extraction, Spin Hall Effect, Spin Seebeck Effect, Spin Current Measurement Mechanism, Magnetoresistance and its different kinds etc. Concept of Giant Magnetoresistance (GMR), different types of GMR, qualitative and quantitative explanation of GMR employing Resistor Network Theory are presented here. Tunnelling Magnetoresistance (TMR), Magnetic Junctions, Effect of various parameters on TMR, Measurement of spin relaxation length and time in the spacer layer are covered here. This book highlights the concept of Spin Transfer Torque (STT), STT in Ferromagnetic Layer Structures, STT driven Magnetization Dynamics, STT in Magnetic Multilayer Nanopillar etc. This book also sheds light on Magnetic Domain Wall (MDW) Motion, Ratchet Effect in MDW motion, MDW motion velocity measurements, Current-driven MDW motion, etc. The book deals with the emerging field of spintronics, i.e., Opto-spintronics. Special emphasis is given on ultrafast optical controlling of magnetic states of antiferromagnet, Spin-photon interaction, Faraday Effect, Inverse Faraday Effect and outline of different all-optical spintronic switching. One more promising branch i.e., Terahertz Spintronics is also covered. Principle of operation of spintronic terahertz emitter, choice of materials, terahertz writing of an antiferromagnetic magnetic memory device is discussed. Brief introduction of Semiconductor spintronics is presented that includes dilute magnetic semiconductor, feromagnetic semiconductor, spin polarized semiconductor devices, three terminal spintronic devices, Spin transistor, Spin-LED, and Spin-Laser. This book also emphasizes on several modern spintronics devices that includes GMR Read Head of Modern Hard Disk Drive, MRAM, Position Sensor, Biosensor, Magnetic Field sensor, Three Terminal Magnetic Memory Devices, Spin FET, Race Track Memory and Quantum Computing.