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Soggetti	Magnetic memory (Computers) Nonvolatile random-access memory
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Nota di contenuto	1. Basic electromagnetism (25 pages) -- 1.1 Introduction -- 1.2 Magnetic force, pole, field, dipole -- 1.3 Magnetic dipole moment, torque and energy -- 1.4 Magnetic flux and magnetic induction -- 1.5 Ampere's circuital law, Biot-Savart law and magnetic field from magnetic material -- 1.5.1 Ampere's Law -- 1.5.2 Biot=Savart's Law -- 1.5.3 Magnetic field from magnetic material -- 1.6 Equations, cgs-SI unit conversion tables -- -- 2 Magnetism and magnetic materials (51 pages) -- 2.1 Introduction -- 2.2 Origin of magnetization -- 2.2.1 From Ampere to Einstein -- 2.2.2 Precession -- 2.2.3 Electron spin -- 2.2.4 Spin-orbit interaction -- 2.2.5 Hund's rules -- 2.3 Classification of magnetisms -- 2.3.1 Diamagnetism -- 2.3.2 Paramagnetism -- 2.3.3 Ferromagnetism -- 2.3.4 Antiferromagnetism -- 2.3.5 Ferrimagnetism -- 2.4 Exchange interactions -- 2.4.1 Direct exchange -- 2.4.2 Indirect exchange: Superexchange -- 2.4.3 Indirect exchange: RKKY interaction -- 2.5 Magnetization in magnetic metals and oxides -- 2.5.1 Slater-Pauling curve -- 2.5.2 Rigid band model -- 2.5.3 Iron oxides and iron garnets -- 2.6 Phenomenology of magnetic anisotropy -- 2.6.1 Uniaxial anisotropy -- 2.6.2 Cubic anisotropy -- 2.7 2Origins of magnetic anisotropy -- 2.7.1 Shape anisotropy -- 2.7.2

Sommario/riassunto

"This book first provides the basics of magnetism that electrical engineering students in the semiconductor curriculum can easily understand. Then, it goes one step forward to discuss electron spin. Following the above background discussion, readers are taught the physics of magnetic tunnel junction device (MTJ), the work horse of MRAM, for memory applications. At the end of this book, the author gives a comparison of emerging non-volatile memories (PCM, ReRAM, FeRAM and MRAM). The author also explores MRAM's unique quality among emerging memories, in that is the only one in which the atoms in the device do not move when switching states. This property makes it the most reliable and low power"--