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Nota di contenuto	Magnetism in Medicine; Contents; Preface; List of Contributors; 1 Introduction; 1.1 The History of Magnetism in Medicine; 1.1.1 Origins; 1.1.2 First Medical Uses of Magnets; 1.1.3 Use of Attracting Forces of Magnets in Medicine; 1.1.4 Treatment of Nervous Diseases and Mesmerism; 1.1.5 Other Medical Uses of Magnets and Magnetism; 1.1.6 The Influence of Magnetic Fields on Man; References; 1.2 Basic Physical Principles; 1.2.1 Introduction; 1.2.2 The Electromagnetic Field Concept and Maxwell Equations; 1.2.2.1 Maxwell Equations in a General Case of Time-Dependent Fields 1.2.2.2 Constant (Time-Independent) Fields: Electro- and Magnetostatics1.2.2.3 Electric and Magnetic Potentials: Concept of a Dipole; 1.2.2.4 Force, Torque and Energy in Magnetic Field; 1.2.3 Magnetic Field in Condensed Matter: General Concepts; 1.2.3.1 Maxwell Equations in Condensed Matter: Magnetization; 1.2.3.2 Classification of Materials According to their Magnetic Properties; 1.2.3.3 Mean Field

Theory of Ferromagnetism; 1.2.4 Magnetic Field in Condensed Matter: Special Topics; 1.2.4.1 Magnetic Energy Contributions; 1.2.4.2 Magnetic Domains and Domain Walls
1.2.4.3 Magnetization Curves and Hysteresis Loops1.2.4.4 Single-Domain Particles and Superparamagnetism; 1.2.4.5 Irreversible Magnetic Relaxation; 1.2.4.6 Reconstruction of Magnetization Distribution Inside a Body from Magnetic Field Measurements; Appendix; References; 1.3 Creating and Measuring Magnetic Fields; 1.3.1 Introduction; 1.3.2 The Generation of Magnetic Fields; 1.3.3 The Measurement of Magnetic Fields; 1.3.4 Discussion; References; 1.4 Safety Aspects of Magnetic Fields; 1.4.1 Introduction; 1.4.2 Risk Evaluation and Guidance on Protection; 1.4.2.1 Evaluation Process
1.4.2.2 Development of Guidance on Protection1.4.3 Static and Extremely Slowly Time-Varying Magnetic Fields (0 to 1 Hz); 1.4.3.1 Interaction Mechanisms and Biological Bases for Limiting Exposure; 1.4.3.2 Epidemiology; 1.4.3.3 Safety Aspects and Exposure Levels; 1.4.4 Time-Varying Magnetic Fields (1 Hz to 100 kHz); 1.4.4.1 Interaction Mechanisms and Biological Bases for Limiting Exposure; 1.4.4.2 Epidemiology; 1.4.4.3 Safety Aspects and Exposure Levels; 1.4.5 Electromagnetic Fields (100 kHz to 300 GHz); 1.4.5.1 Interaction Mechanisms and Biological Bases for Limiting Exposure
1.4.5.2 Epidemiology1.4.5.3 Safety Aspects and Exposure Limits; 1.4.6 Protection of Patients and Volunteers Undergoing MR Procedures; 1.4.6.1 Static Magnetic Fields; 1.4.6.2 Time-Varying Magnetic Gradient Fields; 1.4.6.3 Radiofrequency Electromagnetic Fields; 1.4.6.4 Contraindications; References; 2 Biomagnetism; 2.1 Introduction; 2.2 Biomagnetic Instrumentation; 2.2.1 History; 2.2.2 Biomagnetic Fields; 2.2.3 SQUID Sensor; 2.2.4 Shielding: Magnetically and Electrically Shielded Rooms; 2.2.5 Gradiometers; 2.2.6 Dewar/Cryostat; 2.2.7 Commercial Biomagnetic Measurement Devices
2.2.7.1 4-D Neuroimaging

Sommario/riassunto

This second, completely updated and extended edition of the only reference work in this growing field of medical physics focuses on biomagnetic instrumentation as well as applications in cardiology and neurology. New chapters have been added on fetal magnetography and magnetic field therapy, as well as the safety aspects of magnetic fields. Written by well-known specialists from Germany, USA, Canada, Japan, the Netherlands and Scandinavia, the result is a manual for researchers in this field as well as for those who apply modern methods based on magnetism in medical practice. It equally pro