

1. Record Nr.	UNINA9910813506803321
Titolo	Medical imaging based on magnetic fields and ultrasounds // edited by Herve Fanet
Pubbl/distr/stampa	London, England ; ; Hoboken, New Jersey : , : ISTE : , : Wiley, , 2014 ©2014
ISBN	1-118-76118-9 1-118-76123-5 1-118-76135-9
Descrizione fisica	1 online resource (278 p.)
Collana	Digital Signal and Image Processing Series
Disciplina	616.0754
Soggetti	Diagnostic imaging - Digital techniques Imaging systems in medicine - Data processing
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Cover; Title Page; Contents; Foreword; Chapter 1. Ultrasound Medical Imaging; 1.1. Introduction; 1.2. Physical principles of echography; 1.2.1. Ultrasound waves; 1.2.2. Wavefronts; 1.2.3. Stress/Strain relation; 1.2.4. Propagation equation; 1.2.5. Acoustic impedance; 1.2.6. Acoustic intensity; 1.2.7. Mechanical Index; 1.2.8. Generation, emission; 1.2.9. Resolution; 1.2.10. Propagation of a plane wave in a finite isotropic medium; 1.2.11. Propagation of a plane wave in a non-homogeneous medium; 1.2.12. Speckle; 1.2.13. Nonlinear waves; 1.2.14. Contrast agents; 1.3. Medical ultrasound systems 1.3.1. Principle 1.3.2. The different stages in image formation; 1.3.3. Ultrasound imaging probe; 1.3.4. Modes of imaging, B-mode and M-mode, and harmonic imaging modes; 1.3.5. Doppler imaging; 1.4. The US image; 1.4.1. Properties of speckle, echostructure and statistical laws; 1.4.2. Segmentation of US images; 1.4.3. Simulation of US images; 1.5. Recent advances in ultrasound imaging; 1.5.1. Generation/emission of ultrasounds; 1.5.2. Signal-and image processing; 1.5.3. Multimodal imaging; 1.6. A bright future for ultrasound imaging; 1.7. Bibliography; Chapter 2. Magnetic Resonance Imaging

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2.2. Fundamental elements for MRI; 2.2.1. Introduction; 2.2.2. Vectorial description of nuclear magnetic resonance (NMR); 2.2.3. RF pulses and their effect on magnetizations; 2.2.4. Elementary pulse sequences using the refocusing technique; 2.2.5. Spatial discrimination of signals using gradients: fundamental principle of MRI; 2.2.6. Multi-parameter aspect of MRI; 2.3. Instrumentation; 2.3.1. Introduction; 2.3.2. Recording the signal; 2.3.3. Magnetic systems; 2.3.4. A typical MRI installation in a clinical environment; 2.3.5. Operation and safety; 2.4. Image properties  
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2.6.5. Bi-modal approach to MRI: the example of MR/PET  
2.7. Bibliography; List of Authors; Index

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Sommario/riassunto

This book describes the different principles and equipment used in medical imaging. The importance of medical imaging for diagnostics is rapidly increasing. A good working knowledge of all the different possible physical principles involved in medical imaging is now imperative. This book covers many of these principles including matter photon interactions, the principles of detectors, detectors and information processing for radiology, X-ray tomography, positron tomography, single photon tomography and optical tomography.

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