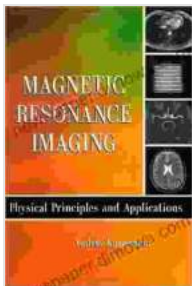


Magnetic Resonance Imaging: Physical Principles And Applications Electromagnetism

Magnetic Resonance Imaging (MRI) is a powerful medical imaging technique that uses magnetic fields and radio waves to create detailed images of the inside of the body. MRI is used to diagnose and treat a wide variety of medical conditions, including cancer, heart disease, and stroke.

MRI is based on the principle of nuclear magnetic resonance (NMR). NMR is a phenomenon that occurs when certain atomic nuclei are placed in a magnetic field. The nuclei align themselves with the magnetic field and then absorb energy from radio waves. The amount of energy that is absorbed depends on the type of nucleus and the strength of the magnetic field.

The absorbed energy is then released as radio waves. The frequency of the radio waves depends on the type of nucleus and the strength of the magnetic field. By measuring the frequency of the radio waves, it is possible to determine the type of nucleus and the strength of the magnetic field.



Magnetic Resonance Imaging: Physical Principles and Applications (Electromagnetism) by Vadim Kuperman

★★★★☆ 4 out of 5

Language : English

File size : 2515 KB

Text-to-Speech: Enabled

Print length : 182 pages



MRI uses this information to create images of the inside of the body. The images are created by combining the signals from all of the nuclei in the body. The resulting images are detailed and can show the structure and function of the body's tissues and organs.

The physical principles of MRI are based on the following concepts:

- **Nuclear magnetic resonance (NMR):** NMR is a phenomenon that occurs when certain atomic nuclei are placed in a magnetic field. The nuclei align themselves with the magnetic field and then absorb energy from radio waves. The amount of energy that is absorbed depends on the type of nucleus and the strength of the magnetic field.
- **Radio waves:** Radio waves are a type of electromagnetic radiation. They are used to excite the nuclei in MRI. The frequency of the radio waves depends on the type of nucleus and the strength of the magnetic field.
- **Magnetic field gradients:** Magnetic field gradients are used to create images of the inside of the body. The gradients cause the nuclei in different parts of the body to experience different magnetic fields. This results in different frequencies of radio waves being emitted from different parts of the body.

MRI is used to diagnose and treat a wide variety of medical conditions, including:

- **Cancer:** MRI can be used to detect and diagnose cancer. It can also be used to monitor the progress of cancer treatment.
- **Heart disease:** MRI can be used to detect and diagnose heart disease. It can also be used to assess the severity of heart disease and to plan treatment.
- **Stroke:** MRI can be used to detect and diagnose stroke. It can also be used to assess the severity of stroke and to plan treatment.
- **Other conditions:** MRI can also be used to diagnose and treat a variety of other medical conditions, including:
 - Musculoskeletal disFree Downloads
 - Neurological disFree Downloads
 - Abdominal disFree Downloads
 - Pelvic disFree Downloads

Electromagnetism is a branch of physics that deals with the interaction of electric and magnetic fields. MRI uses electromagnetism to create the magnetic fields and radio waves that are used to create images of the inside of the body.

The magnetic fields used in MRI are created by passing an electric current through a coil of wire. The strength of the magnetic field depends on the amount of current that is flowing through the coil.

The radio waves used in MRI are created by an antenna. The antenna is connected to a radio transmitter. The radio transmitter sends out a pulse of

radio waves. The radio waves travel through the body and interact with the nuclei in the body.

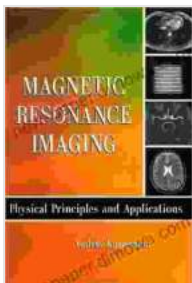
The nuclei absorb energy from the radio waves and then release the energy as radio waves. The frequency of the radio waves depends on the type of nucleus and the strength of the magnetic field.

The radio waves are detected by an antenna. The antenna is connected to a radio receiver. The radio receiver amplifies the radio waves and sends them to a computer.

The computer processes the radio waves and creates images of the inside of the body.

MRI is a powerful medical imaging technique that uses magnetic fields and radio waves to create detailed images of the inside of the body. MRI is used to diagnose and treat a wide variety of medical conditions, including cancer, heart disease, and stroke.

The physical principles of MRI are based on the concepts of nuclear magnetic resonance (NMR), radio waves, and magnetic field gradients. MRI uses electromagnetism to create the magnetic fields and radio waves that are used to create images of the inside of the body.



Magnetic Resonance Imaging: Physical Principles and Applications (Electromagnetism) by Vadim Kuperman

★★★★☆ 4 out of 5

Language : English

File size : 2515 KB

Text-to-Speech: Enabled

Print length : 182 pages

FREE

DOWNLOAD E-BOOK



How Product Managers Can Sell More of Their Product

Product managers are responsible for the success of their products. They need to make sure that their products are meeting the needs of customers and that they are being...



Unveiling the Secrets to Food Truck Success: Tips for Running and Managing Your Thriving Enterprise

: Embarking on Your Culinary Adventure The allure of food trucks has captivated entrepreneurs and foodies alike, offering boundless opportunities for culinary...