Radiological Physics and Radiation Dosimetry

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Introduction to Radiological Physics and Radiation Dosimetry

This publication is aimed at students and teachers involved in programmes that train radiologic physicists and clinical physicists in practice. It is also useful for practicing radiologic physicists, state examiners, and medical physicists involved in the training of radiation protection personnel.

The book is divided into seven parts:

1. Introduction to Radiology and Radiological Physics
2. Basic Concepts of Radiological Physics
3. Attenuation of Radiant Energy
4. Interaction of Radiant Energy with Matter
5. Dosimetry of Ionizing Radiation
6. Dosimetry of Neutron and Photon Beams
7. Radiation Protection

Each part is further divided into several chapters, each of which covers a specific topic in detail.

Introduction to Radiology and Radiological Physics

This chapter introduces the basic concepts of radiology and radiological physics. It covers topics such as the history of radiology, the nature of electromagnetic radiation, and the basic principles of X-ray production and detection.

Basic Concepts of Radiological Physics

This chapter covers the basic concepts of radiological physics, including the absorption and scattering of radiation, the Beer-Lambert law, and the inverse square law.

Attenuation of Radiant Energy

This chapter discusses the attenuation of radiant energy, including the concepts of linear attenuation coefficient and mass energy absorption coefficient.

Interaction of Radiant Energy with Matter

This chapter describes the interaction of radiant energy with matter, including the collision and excitation processes, fluorescent and characteristic X-ray production, and the Compton and pair production processes.

Dosimetry of Ionizing Radiation

This chapter covers the dosimetry of ionizing radiation, including the concepts of absorbed dose, dose equivalent, and rem.

Dosimetry of Neutron and Photon Beams

This chapter discusses the dosimetry of neutron and photon beams, including the concepts of neutron and photon dosimetry, and the measurement of absorbed dose and dose equivalent.

Radiation Protection

This chapter covers radiation protection, including the principles of radiation protection, the regulations and standards for radiation protection, and the methods for monitoring and controlling radiation exposure.

In summary, this publication provides a comprehensive overview of radiological physics and radiation dosimetry. It is an essential resource for students, teachers, and practicing radiologic physicists.

Introduction to Physics in Medicine

This book covers a broad range of topics in medical physics, including imaging, radiation therapy, radiation protection, and radiation dosimetry. The book is divided into seven parts:

1. Introduction to Physics in Medicine
2. Imaging Techniques
3. Radiation Therapy
4. Radiation Protection
5. Radiation Dosimetry
6. Applications of Medical Physics
7. Medical Physics in Practice

Each part is further divided into several chapters, each of which covers a specific topic in detail.

Introduction to Physics in Medicine

This chapter introduces the basic concepts of physics in medicine, including the principles of wave mechanics, quantum mechanics, and special relativity.

Imaging Techniques

This chapter covers the basic concepts of imaging techniques, including X-ray imaging, CT imaging, MRI imaging, and ultrasound imaging.

Radiation Therapy

This chapter discusses the principles of radiation therapy, including the concepts of radiation dose, radiation damage, and radiation therapy planning.

Radiation Protection

This chapter covers radiation protection, including the principles of radiation protection, the regulations and standards for radiation protection, and the methods for monitoring and controlling radiation exposure.

Radiation Dosimetry

This chapter discusses the dosimetry of ionizing radiation, including the concepts of absorbed dose, dose equivalent, and rem.

Applications of Medical Physics

This chapter covers the applications of medical physics, including molecular imaging, radiation therapy, and radiation protection.

Medical Physics in Practice

This chapter provides practical examples of the application of medical physics in clinical practice, including case studies and problem-solving exercises.

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