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BOOK REVIEW

Book review: *The Physics of Radiotherapy X-rays and Electrons* by Peter Metcalfe, Tomas Kron, Peter Hoban, Dean Cutajar and Nicholas Hardcastle

Medical Physics Publishing, 2023

Alexandre M. C. Santos[1,2,3]

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Medical Physics Publishing has updated and expanded the second edition of "The Physics of Radiotherapy X-rays and Electrons," which was published in 2007, superseding "The Physics of Radiotherapy X-rays from Linear Accelerators" published in 1997. Revisiting this updated text brings back memories of reading the second edition as a university student and during my clinical training. I particularly remember how well the discussions and explanations of dose calculations were presented, and I would routinely return to that chapter. Much has happened in the past decade and a half, making this update timely and welcome.

The third edition consists of 14 chapters, the same number as the second edition, albeit with some alterations. The order of the chapters has changed, and in some cases, contents have been merged to make space for new chapters on imaging for radiotherapy treatment planning and adaptive radiation therapy. Additionally, two new experts, Dean Cutajar and Nicholas Hardcastle, have joined the authors of the previous editions. Specific content experts, including Jo McNamara, Michael Jameson, and Vikneswary Batumalai, were also invited to contribute chapters.

Each chapter begins with a quote, which I particularly enjoyed, as it provides continuity with the previous edition. Each chapter also ends with five questions, with answers found in the appendix. The structure of the book starts with fundamental physics and beam properties. The first chapter describes the generation of electrons and x-rays and key components in medical linear accelerators. Chapter 2 covers the interaction properties of x-rays and electrons, with a section at the end on proton interactions. The following two chapters cover x-ray and electron beam properties, with a section at the end of Chap. 4 discussing proton beam therapy.

The subsequent chapters follow the path a patient takes during their radiation therapy. Chapter 5 discusses imaging in treatment planning, Chap. 6 covers the treatment planning process for x-rays, and Chaps. 7 and 8 address image-guided radiotherapy and adaptive radiotherapy, respectively. Chapter 9 covers stereotactic radiosurgery, with a section at the end dedicated to stereotactic body radiotherapy.

The final chapters bring the reader back to modern dose computation methods in Chap. 10, a section I enjoyed greatly in the second edition. Chapter 11 covers dose measurement of megavoltage beams, discussing different phantoms and commonly used dosimeters. Chapter 12 discusses quality assurance, and the final two chapters cover radiation protection principles and radiobiology.

Similar to the previous editions, this book is well-structured and well-written. The hardcover print is of high quality, and the illustrations are in colour. Unfortunately, in my version of the textbook, the running title for the Stereotactic Radiosurgery chapter had the incorrect chapter number. However, this minor error did not detract from the overall quality of the textbook. I applaud the authors for undertaking the monumental task of creating the third edition of this textbook. I believe it has been a success and will maintain its place as a reference textbook for the physics of radiotherapy with x-rays and electrons.

✉ Alexandre M. C. Santos
alexandre.santos@adelaide.edu.au

1 Department of Medical Physics, Royal Adelaide Hospital, Adelaide, SA 5000, Australia

2 The Australian Bragg Centre for Proton Therapy and Research, Adelaide, SA 5000, Australia

3 School of Physics, Chemistry and Earth Sciences, University of Adelaide, Adelaide, SA 5005, Australia

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I hope this third edition supports, motivates, and inspires other early-career radiation oncology physicists as the second edition did for me so many years ago.

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