BOOK REVIEW
THE PHYSICS & TECHNOLOGY OF RADIATION THERAPY, II EDITION BY PATRICK N. MCDERMOTT AND COLIN G. ORTON, MADISON, WI: MEDICAL PHYSICS PUBLISHING, 2018

Drs. McDermott and Orton have written an excellent timely textbook that can be used by graduate and undergraduate students of medical physics, radiation oncology residents and radiation therapy technology students. The authors are distinguished medical physicists. Dr. McDermott is the director of physics education at Beaumont Health Royal Oak Michigan. Dr. Orton is an emeritus professor in the radiation oncology department at Wayne State University. He directed the WSU Medical Physics Graduate Program for over 20 years.

The book should be the first book any medical physics student interested in radiation oncology physics should buy. It is “the physics book” for radiation oncology residents and a necessity for the radiation technology students.

The book begins with review of basic mathematics, Chapter 1, appropriate for the technology students and residents and continues with a review of basic physics in Chapter 2. These reviews are coherent and establish the formalism that follows. Chapters 3 and 4 introduce atomic theory, radioactivity and x-ray production. The interaction of radiation with matter follows in Chapter 6, with clear and concise explanation. Chapter 7 has a thorough discussion of radiation units and contains an explanation of the Monte Carlo technique. Residents have told me that they understood Monte Carlo Calculations for the first time, reading this book. Chapter 9 explains how the linear accelerator works, with an interesting side note on the cavity magnetron ???(I no longer feel guilty not understanding how it works), again with appropriate diagrams, figures and pictures. Chapters 12 through 14 cover monitor unit calculations, dose distributions and evaluation of patient dose distribution using modern concepts (TCP, NTCP), again the explanations are clear. IMRT, IMAT, and inverse planning are introduced in Chapter 15. The benefits of IMRT are demonstrated beautifully in Figure 15.3. The chapter ends with an explanation of physics plan validation.

There are chapters on electron beam dosimetry, brachytherapy and a very complete discussion of Radiation Protection (with contributions by Cheryl Schultz).

The chapter on Proton Therapy Physics stands out in its lucidity and completeness. This rapidly growing modality has a well-deserved description in this book. There are also chapters on Imaging in Radiation Therapy and Special Modalities. The chapter on Special Modalities discusses radiosurgery the gamma knife, and TBI. There is a chapter on Quality Assurance and Safety which introduces the role of regulatory bodies and QA of radiation therapy equipment.

Each chapter ends with a summary and problems; Appendix D has the answers to most problems.

Appendix A gives the listing of topics that need to be studied for the ABR Exam for radiation oncology residents indexed by topic to sections in the book. Similarly it gives the topics needed for the ARRT and Medical Dosimetrist Certification exams indexed to sections in the text. Appendix B contains dosimetry data for some common beams and isotopes. While Appendix D is Beam Data for a fictitious linear accelerator used in the problems.

This is an excellent book; the presentation of the book diagrams, figures, pictures (many in color), and selection of problems are clear and logical and make this book a classic. It is evident that the authors have taught this subject for a long time and were able to distill and explain concepts in a clear and interesting ways.

The authors have written a spellbinding textbook that belongs on the bookshelf of every medical physicist both as a reference and as guide.

Because the nature of our field, constant advances in technology, this book will certainly be eclipsed; but it surely belongs in the pantheon of great medical physics textbooks.

I wish I had this book when I was a student.

Summary: This is a great textbook for medical physics students, for radiation oncology residents, and for radiation oncology technology students.

PS: The publisher should publish the tables figures and pictures as a power point presentation. This exist for a number of texts (Sorensen and Phelps, Wolbarst, etc). This would help in teaching and I would be happy to buy it.

Reviewed by Thomas Lowinger

Thomas Lowinger is a somewhat retired medical physicist, presently consultant for Radiosurgery NY, a private clinic. He has taught medical physics for residents, physicists, and technology students in the NYC metropolitan area over the last 40 years..