"THE PHYSICS OF DIAGNOSTIC IMAGING" - A BRIEF OVERVIEW

Tabakov, S.[1,2],

[1] King's College London, UK, [2] President IOMP (International Organization of Medical Physics)

Abstract— **This article is a brief review of the textbook The Physics of Diagnostic Imaging, (2017 Revised Reprint of the 2006 Second Edition), David J. Dowsett, Patrick A. Kenny and R. Eugene Johnston, CRC Press, ISBN-13 978 0 340 80891 7**

The book by Dowsett, Kenny and Johnston is a well-known teaching aid for many young medical physicists. It is one of the best illustrated books on the subject, written very well, and thus allowing a smooth knowledge transfer.

The whole book is written with the aim to allow the reader to understand the basic concepts of Diagnostic Imaging – physical principles, equipment, image quality and radiation safety. The book has 22 chapters which lead the reader from basic mathematics and physics, to X-ray imaging principles and equipment, Nuclear Medicine principles and equipment, Ultrasound principles and equipment, MRI principles and equipment, Radiation protection principles. The book has 725 pages, which include an extended index with 32 pages.

Based on the fact that X-ray imaging continues to comprise more than 2/3 of all imaging procedures in healthcare, the main part of the book is dedicated to X-ray imaging principles and equipment (about half of it). This is one of the specific advantages of the book. The description of the other imaging modalities are relatively equally distributed in the remaining half of the book.

The book includes many illustrations – about 580 figures, some of which with two or more images. The figures are perfectly executed with many additional explanations, related to the subject. The quality of the printout of the diagrams and diagnostic images is excellent. The book also includes many tables with coefficients and useful data – about 230 tables in total.

A unique feature of the book are the Boxes with examples (e.g. calculating the total efficiency of a detector). There are about 115 Boxes with examples and they are excellent teaching aids.

Each chapter includes also a list of keywords with explanations, which are in fact a brief dictionary. Many chapters include also recommended further reading.

The chapters have many sub-chapters, thus transforming the book into an easy to navigate reference material. Sometimes sub-chapters finish with a Summary. All text in the book is very easy to read. One feels that each sentence has been carefully crafted. This will be useful to a very wide spectrum of readers – from radiology or radiography students to medical physics post-graduates.

The introductory chapters related to Basis of mathematics and physics will be very useful to readers in the medical profession. At the same time the physics of various imaging modalities (supported with relevant diagrams and equations) is suitable for young medical physicists. Again, the examples are making clear the explanations using real quantities – e.g. Box 16.5 "Relationship between matrix size and noise for three sizes of matrix" and Figure 16.7 (d) "Loss of visible contrast through the imaging chain from uses of different gamma values".

This is a typical teaching textbook, not for the advanced researcher, but for students and colleagues from different fields of the profession, who would like to quickly refresh part of their knowledge.

Medical physics is a very dynamic profession and obviously each author of a textbook is aware that the book will be soon be in need of upgrade. The current upgrade of The Physics of Diagnostic Imaging has been completed to a high standard – keeping all essential materials from the previous editions, as well as inserting new elements.

This book can easily be seen as essential textbook on the subject, which can be used by students in various countries. It is without doubt one of the best textbooks on Physics of Diagnostic Imaging.