

**ELSEVIER**  
SAUNDERS

1600 John F. Kennedy Blvd.  
Ste 1800  
Philadelphia, PA 19103-2899

Physics in Nuclear Medicine

ISBN: 978-1-4160-5198-5

**Copyright © 2012, 2003, 1987, 1980 by Saunders, an imprint of Elsevier Inc.**

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publisher. Details on how to seek permission, further information about the Publisher's permissions policies and our arrangements with organizations such as the Copyright Clearance Center and the Copyright Licensing Agency, can be found at our website: [www.elsevier.com/permissions](http://www.elsevier.com/permissions).

This book and the individual contributions contained in it are protected under copyright by the Publisher (other than as may be noted herein).

#### Notice

Knowledge and best practice in this field are constantly changing. As new research and experience broaden our understanding, changes in research methods, professional practices, or medical treatment may become necessary or appropriate. Readers are advised to check the most current information provided (i) on procedures featured or (ii) by the manufacturer of each product to be administered, to verify the recommended dose or formula, the method and duration of administration, and contraindications. It is the responsibility of practitioners, relying on their own experience and knowledge of their patients, to make diagnoses, to determine dosages and the best treatment for each individual patient, and to take all appropriate safety precautions. To the fullest extent of the law, neither the Publisher nor the authors assume any liability for any injury and/or damage to persons or property as a matter of products arising out of or related to any use of the material contained in this book.

#### Library of Congress Cataloging-in-Publication Data

Cherry, Simon R.

Physics in nuclear medicine / Simon R. Cherry, James A. Sorenson, Michael E. Phelps.  
—4th ed.

p. ; cm.

Includes bibliographical references and index.

ISBN 978-1-4160-5198-5 (hardback : alk. paper)

1. Medical physics. 2. Nuclear medicine. I. Sorenson, James A., 1938- II. Phelps, Michael E. III. Title.

[DNLM: 1. Health Physics. 2. Nuclear Medicine. WN 110]

R895.S58 2012

610.1'53—dc23

2011021330

*Senior Content Strategist:* Don Scholz

*Content Development Specialist:* Lisa Barnes

*Publishing Services Manager:* Anne Altepeter

*Senior Project Manager:* Janaki Srinivasan Kumar

*Project Manager:* Cindy Thoms

*Design Direction:* Ellen Zanolle

Printed in China

Last digit is the print number: 9 8 7 6 5 4 3 2 1

Working together to grow  
libraries in developing countries

[www.elsevier.com](http://www.elsevier.com) | [www.bookaid.org](http://www.bookaid.org) | [www.sabre.org](http://www.sabre.org)

ELSEVIER

BOOK AID  
International

Sabre Foundation