

BOOK REVIEW POLICY

Books may be requested from the Book Review Editor, Richard Marchand, by using the online book request form at <http://www.cap.ca>. You must be a residing in Canada to request a book.

CAP members are given the first opportunity to request books. For non-members, only those residing in Canada may request a book. Requests from non-members will only be considered one month after the distribution date of the issue of *Physics in Canada* in which the book was published as being available.

The Book Review Editor reserves the right to limit the number of books provided to reviewers each year. He also reserves the right to modify any submitted review for style and clarity. When rewording is required, the Book Review Editor will endeavour to preserve the intended meaning and, in so doing, may find it necessary to consult the reviewer. Reviewers submit a 300-500 word review for publication in PiC and posting on the website; however, they can choose to submit a longer review for the website together with the shorter one for PiC.

LA POLITIQUE POUR LA CRITIQUE DE LIVRES

Si vous voulez faire l'évaluation critique d'un ouvrage, veuillez entrer en contact avec le responsable de la critique de livres, Richard Marchand, en utilisant le formulaire de demande électronique à <http://www.cap.ca>.

Les membres de l'ACP auront priorité pour les demandes de livres. Ceux qui ne sont pas membres et qui résident au Canada peuvent faire une demande de livres. Les demandes des non-membres ne seront examinées qu'un mois après la date de distribution du numéro de la *Physique au Canada* dans lequel le livre aura été déclaré disponible.

Le Directeur de la critique de livres se réserve le droit de limiter le nombre de livres confiés chaque année aux examinateurs. Il se réserve, en outre, le droit de modifier toute critique présentée afin d'en améliorer le style et la clarté. S'il lui faut reformuler une critique, il s'efforcera de conserver le sens voulu par l'auteur de la critique et, à cette fin, il pourra juger nécessaire de le consulter. Les critiques pour publication dans la PaC doivent être de 300 à 500 mots. Ces critiques seront aussi affichées sur le web ; s'ils le désirent les examinateurs peuvent soumettre une plus longue version pour le web.

BOOKS RECEIVED / LIVRES REÇUS

The following titles are a sampling of books that have recently been received for review. Readers are invited to write reviews, in English or French, of books of interest to them. Unless otherwise indicated, all prices are in Canadian dollars.

Lists of all books available for review, books out for review and book reviews published since 2011 are available on-line at www.cap.ca (Publications).

In addition to books listed here, readers are invited to consider writing reviews of recent publications, or comparative reviews on books in topics of interest to the physics community. This could include for example, books used for teaching and learning physics, or technical references aimed at professional researchers.

Les titres suivants sont une sélection des livres reçus récemment aux fins de critique. Nous invitons nos lecteurs à nous soumettre une critique en anglais ou en français, sur les sujets de leur choix. Sauf indication contraire, tous les prix sont en dollars canadiens.

Les listes de tous les livres disponibles pour critique, ceux en voie de révision, ainsi que des critiques publiées depuis 2011 sont disponibles sur : www.cap.ca (Publications).

En plus des titres mentionnés ci-dessous, les lecteurs sont invités à soumettre des revues sur des ouvrages récents, ou des revues thématiques comparées sur des sujets particuliers. Celles-ci pourraient par exemple porter sur des ouvrages de nature pédagogique, ou des textes de référence destinés à des professionnels.

GENERAL LEVEL

CONFORMAL METHODS IN GENERAL RELATIVITY, Juan A. Valiente Kroon, Cambridge University Press, 2016; pp. 622; ISBN: 978-1107033894; Price: 143.95.

HADRONS AT FINITE TEMPERATURE, Samir Nath Mallik & Sourav Sarkar, Cambridge University Press, 2016; pp. 262; ISBN: 978-1107145313; Price: 119.55.

THE INVENTION OF TIME AND SPACE: ORIGINS, DEFINITIONS, NATURE, PROPERTIES, Patrice F. Dassonville, Springer, 2016; pp. 176; ISBN: 978-3319460390; Price: 121.02.

THE NEW ECOLOGY: RETHINKING A SCIENCE FOR THE ANTHROPOCENE, Oswald J. Schmitz, Princeton University Press, 2016; pp. 256; ISBN: 9780691160566; Price: 43.95.

SENIOR LEVEL

COMBUSTION WAVES AND FRONTS IN FLOWS: FLAMES, SHOCKS, DETONATIONS, ABLATION FRONTS AND EXPLOSION OF STARS, Paul Clavin and Geoff Searby, Cambridge University Press, 2016; pp. 720; ISBN: 978-1107098688; Price: 218.95.

COSMIC MAGNETIC FIELDS, Philipp P. Kronberg, Cambridge University Press, 2016; pp. 294; ISBN: 978-0521631631; Price: 160.95.

HADRONS AT FINITE TEMPERATURE (2ND COPY), Samir Nath Mallik & Sourav Sarkar, Cambridge University Press, 2016; pp. 262; ISBN: 978-1107145313; Price: 119.55.

MAXWELL'S ENDURING LEGACY: A SCIENTIFIC HISTORY OF THE CAVENDISH LABORATORY, Malcolm Longair, Cambridge University Press, 2016; pp. 650; ISBN: 978-1107083691; Price: 57.24.

SAMIRNATH MALLIK & SOURAV SARKAR, **HADRONS AT FINITE TEMPERATURE (2ND COPY)**, Cambridge University Press, 2016; pp. 262; ISBN: 978-1107145313; Price: 119.55.

SUPERSYMMETRY, SUPERGRAVITY, AND UNIFICATION (CAMBRIDGE MONOGRAPHS ON MATHEMATICAL PHYSICS), Pran Nath, Cambridge University Press, 2016; pp. 536; ISBN: 978-0521197021; Price: 94.99.

SUPERSYMMETRY, SUPERGRAVITY, AND UNIFICATION (CAMBRIDGE MONOGRAPHS ON MATHEMATICAL PHYSICS) - 2ND COPY, Pran Nath, Cambridge University Press, 2016; pp. 536; ISBN: 978-0521197021; Price: 94.99.

THE STRUCTURE AND DYNAMICS OF CITIES: URBAN DATA ANALYSIS AND THEORETICAL MODELING, Marc Barthelemy, Cambridge University Press, 2017; pp. 278; ISBN: 978-1107109179; Price: 94.99.

BOOK REVIEWS / CRITIQUES DE LIVRES

Book reviews for the following books have been received and posted to the Physics in Canada section of the CAP's website: <http://www.cap.ca>.

Des revues critiques ont été reçues pour les livres suivants et ont été affichées dans la section "La Physique au Canada" de la page web de l'ACP: <http://www.cap.ca>.

ELECTRICITY AND MAGNETISM by Edward Purcell, Cambridge University Press, 2013, pp: 484, ISBN: 978-107-01360-5, price 70.00.

This second edition was first published in 1985, and is based on the first edition first published in 1963. This textbook in its variety of editions is widely used for Electricity and Magnetism courses at the undergraduate level. It was originally written as part of a series of four courses that formed the core of the Berkeley undergraduate physics degree. It should be noted that there is a third edition by Purcell and Morin, that has been updated with additional examples and the use SI units instead of the cgs units of this second edition. The book would be good for a second year undergraduate physics course, where the students are already getting some exposure to vector calculus in concurrent math courses. I would place its level as being slightly simpler than that of Griffiths, "Introduction to Electrodynamics," but above the typical first year textbook treatment.

The first chapter largely covers electric fields from point charges and continuous charge distributions, and introduces Gauss' law. There are sections on electrical energy, force on a layer of charge and energy associated with the electric field that feel a bit out of place, but otherwise the description is excellent. The addition of the examples in the third edition are very welcome.

The second and third chapters present the electric potential, and electric fields around conductors which includes capacitance of different arrangements of conductors. The treatments of both of these is very well done. The fourth chapter on electric currents builds up to DC circuits from a fundamental level.

Chapter five describes the electric field from a moving point charge, in a way I haven't seen in other introductory textbooks. It assumes that students already have some familiarity with special relativity and derives what the electric field from a moving

charge looks like. The description is again very well done, and leads to a picture of what the electric field around an accelerating charge looks like.

Chapters six and seven introduce the magnetic field and electromagnetic induction respectively. Inductance and circuits with inductive components are introduced near the end of chapter seven.

The eighth chapter is on alternative current circuits, and is done using complex impedance and admittance as it should be at this level.

Chapter nine introduces the displacement current, and Maxwell's equations in differential form. Electromagnetic waves are then shown to result from these equations. Plane wave propagation and the power density in electromagnetic waves is described.

Chapters ten and eleven describe electric field in matter and magnetic fields in matter respectively. The exposition again proceeds from fundamental physics arguments, starting from the electric dipole for electric fields in matter, leading to a description of dielectrics in capacitors. Magnetization and ferromagnetic materials are also introduced.

In summary this textbook introduces electricity and magnetism in a nice logical order. Electricity and magnetism is of course the favourite first application of the vector calculus methods in a physics course, and the text does a good job of introducing the mathematics as it is being used, rather than in a separate introductory chapter with just the math. The figures are simple grey scale but are well done, and augment the description of the concepts which are presented in a practical and pedagogical way. I would recommend the third edition over this edition, due to the additional examples provided, and the use of SI units.

Blair Jamieson
University of Winnipeg

INCOMING ASTEROID! WHAT COULD WE DO ABOUT IT by Duncan Lunan, Springer, 2013, pp: 390, ISBN 146148748X (ISBN 13: 9781461487487), price 54.12.

Once in a while, we get smacked on the head by one of the millions of Near Earth Objects (NEOs) that cross our planet's orbital trajectory. One of those bolides created quite a commotion in Russia a few years ago; the Chelyabinsk meteor was an atmospheric phenomenon due to a small asteroid entering the atmosphere at a shallow angle, at speeds of 19-20 km/s over Russia in February 2013. Exploding catastrophically in mid-air, it generated a shower of smaller meteorites and a detonation shock wave, releasing about 2PJ of energy, or 500kT of TNT, nearly 30 times Hiroshima! The small object measured approximately 20 m in diameter and weighed some 12 kT. No fatalities were reported, but one thousand people were injured.

On the other end of the scale, the Chixhulub impact in Yucatan, which coincided with the geological Cretaceous–Paleogene boundary (K–Pg boundary) around 66 million years ago, was 500 times larger and released more than 400 ZJ (Zeta Joules) - or over a billion times the energy of the atomic bombings of Hiroshima and Nagasaki. Leading to one of the six major planetary extinction events in earth's history, accompanied with the passing away of 75% of all planetary biota.

At impact, most of the kinetic energy is transformed into a detonation. The pock marks and craters on the face of the earth and the moon tell us that statistically, a small meteorite under 5 m will reach us every 10 years. A larger one in the 100m range will occur every 11 ky and a 1km diameter impactor will reach us every half million years or so.

We have yet to record a death from a meteorite impact, although statistically there is a probability of one person for every 200,000, being hit in a