

Bookshelf

Imaging gaseous detectors and their applications

By *Eugenio Nappi and Vladimir Peskov*

Wiley-VCH

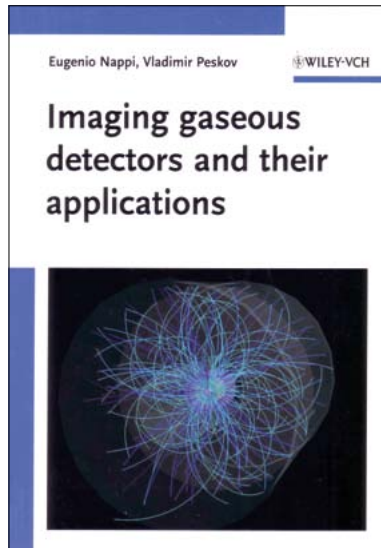
Hardback: €139

Paperback: €124.99

For those who belong to the Paleozoic era of R&D on gas detectors, this book evokes nostalgic memories of the hours spent in dark laboratories chasing sparks under black cloths, chasing leaks with screaming “pistols”, taming coronas with red paint and yellow tape and, if you belonged to the crazy ones of Building 28 at CERN, sharing a glass of wine and the incredible maggoty Corsican cheese with Georges Charpak. Subtitle it “The sorcerer’s Apprentice”, and an innocent student might think they have entered the laboratory of Merlin: creating electrons from each fluttering photon, making magical mixtures of liquids, exotic vapours, funny thin films and all of the strange concoctions that inhabited the era of pioneering R&D and led step-by-step to today’s devices.

The historical memory behind this book recalls all sorts of gaseous detectors that have been dreamt up by visionary scientists over the past 50 years: drift chambers, the ambitious time-projection chamber, resistive plate chambers, ring-imaging Cherenkov counters, parallel-plate avalanche counters, gas electron multipliers, Micromegas, exotic micro-pattern gaseous detectors (MPGDs) and more. All are included, both the ones that behaved and the ones that did not pay off – providing no excuse for anyone to re-make mistakes after reading the book. All of the basic processes that populate gas counters are reviewed and their functioning and limitations are explained in a simple and concise manner offering, to the attentive reader, key secrets and the solutions to obviate hidden traps. From the basic ionization processes to the trickiness of the streamer and breakdown mechanism, from the detection of a single photon to the problems of high rates – only lengthy, hands-on experience supported by a profound understanding of the physics of the detection processes could bring together the material that this book covers. Furthermore, it includes many notable explanations that are crystal clear yet also suitable for the theoretical part of a high-profile educational course.

Coming to more recent times, the use of microelectronics techniques in the manufacturing process of gas counters has paved the road to the new era of MPGDs.



The authors follow this route, the detector designs and the most promising future directions and applications, critically but with great expectation, leaving the reader confident of many developments to come.

Each of us will find in this book some corner of our own memory, the significance of our own gaseous detector in recent and current experiments, together with a touch of the new in exploring the many possible applications of gas counters in medicine, biology or homeland security and – when closing the book – the compelling need to stay in the lab. *Chapeau!*

• *Ariella Cattai, CERN.*

Books received

Industrial Accelerators and Their Applications

By *Robert W Hamm and Marianne E Hamm (eds.)*

World Scientific

Hardback: £100

E-book: £127



This new book provides a comprehensive review of the many current industrial applications of particle accelerators, written by experts in each of these fields. Readers will gain a broad understanding of the principles of these applications, the extent to which they are employed and the accelerator technology utilized. It also serves as a thorough introduction to these fields for non-experts and laymen alike. Owing to the

growing number of industrial applications, there is an increased interest among accelerator physicists and many other scientists worldwide in understanding how accelerators are used in various applications. Many industries are also doing more research on how they can improve their products or processes using particle beams.

An Introduction to Non-Perturbative Foundations of Quantum Field Theory

By *Franco Strocchi*

Oxford University Press

Hardback: £55 \$98.50



Quantum Field Theory (QFT) has proved to be the most useful strategy for the description of elementary-particle interactions and as such is regarded as a fundamental part of modern theoretical physics. In most presentations, the emphasis is on the effectiveness of the theory in producing experimentally testable predictions, which at present essentially means perturbative QFT. However, after more than 50 years of QFT, there is still no single non-trivial (even non-realistic) model of QFT in 3+1 dimensions, allowing a non-perturbative control. This book provides general physical principles and a mathematically sound approach to QFT. It covers the general structure of gauge theories, presents the charge superselection rules, gives a non-perturbative treatment of the Higgs mechanism and covers chiral symmetry breaking in QCD without instantons

Novel Superfluids: Volume 1

By *Karl-Heinz Bennemann and John B Ketterson (eds.)*

Oxford University Press

Hardback: £125 \$210



This volume reports on the latest developments in the field of superfluidity. The phenomenon has had a tremendous impact on the fundamental sciences as well as a host of technologies. In addition to metals and the helium liquids, the phenomenon has now been observed for photons in cavities, excitons in semiconductors, magnons in certain materials and cold gases trapped in high vacuum. It very likely exists for neutrons in a neutron star and, possibly, in a conjectured quark state at their centre. Even the universe itself can be regarded as being in a kind of superfluid state. All of these topics are discussed by experts in the respective subfields.



Multi-element X-ray detectors for beam-line applications

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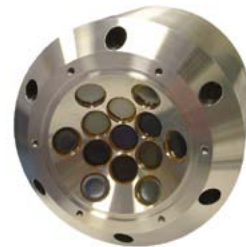
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- Micro X-ray fluorescence (μXRF)
- X-Ray Fluorescence (XRF)



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handy stand alone
form
factor



WELCOME

CERN Courier – digital edition

Welcome to the digital edition of the May 2013 issue of *CERN Courier*.

Last July, the ATLAS and CMS collaborations announced the discovery of a new particle at the LHC with a mass of 125 GeV. They referred to it as a “Higgs-like boson” because further data were needed to pin down more of its properties. Now, the collaborations have amassed enough evidence to identify the new particle as a Higgs boson, although the question remains of whether it is precisely the Higgs boson of the Standard Model of particle physics. The discovery brings the final touches to a picture that came into focus 30 years ago, when experiments at CERN first observed the W and Z bosons. The masses of these particles were just as electroweak theory predicted, based on their interactions with a hypothesized Higgs field and its boson. Meanwhile, other particle interactions continue to provide puzzles in more complex systems, from relatively simple nuclei to the hot, dense fireball created in heavy-ion collisions.

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