

Bookshelf

Léon Rosenfeld: Physics, Philosophy, and Politics in the Twentieth Century

By Anja Skaar Jacobsen

World Scientific

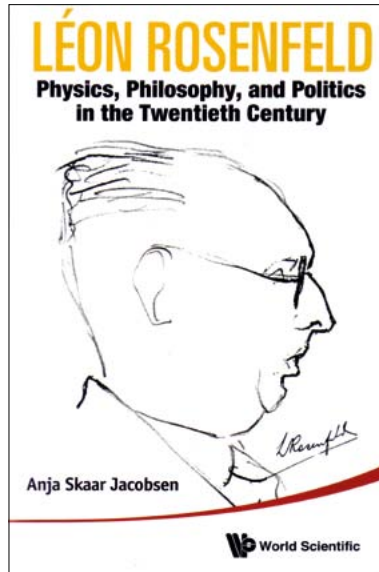
Hardback: £56

E-book: £69

The life of Léon Rosenfeld (1904–1974) spanned all of the three main epochs of the development of physics during the 20th century, at least according to the classification that Vicky Weisskopf expressed in a colloquium at CERN entitled “The development of science during this century”. So it should not be surprising that, as Anja Skaar Jacobsen of the Niels Bohr Archive demonstrates, the activities of this outstanding Belgian physicist cannot be grouped into a single category. Rosenfeld, who was extremely curious and erudite, contributed substantially to electrodynamics, to the Copenhagen interpretation of quantum mechanics and to the problem of the measurability of quantum fields. He was also a science historian, a tenacious political activist and, last but not least, the founding editor of the journal *Nuclear Physics*.

The first and second of the six chapters follow Rosenfeld’s life and interests through the 1930s up to the period where he actively participated in the formulation of the so-called Copenhagen interpretation of quantum theory and collaborated with Niels Bohr. The interface between science and politics in this period is specifically addressed in the third chapter. Rosenfeld never joined the communist party but progressively became a convinced leftist intellectual. Prior to the Stalinist purge in the second half of the 1930s, Copenhagen was also at the heart of political debates, hosting many leaders such as Lev Trotsky who visited Denmark in 1932. The fourth chapter describes how Rosenfeld survived the war in Utrecht where he took over the position of George Uhlenbeck, who left for the US in 1939. The final two chapters focus on his political commitment during the Cold War and on heated discussions surrounding the attacks on the Copenhagen interpretation, which Rosenfeld fiercely defended throughout his life.

The interests of Rosenfeld and the second “quantum generation” implicitly encourage debates. In a purely scientific context, there is the broad problem of the interpretation of quantum mechanics. The quantum theory of measurement was perceived as essential in the 1930s and throughout the 1940s. How does a classical object interact



with a quantum system? Does it make sense to separate the world into quantum systems (the observables) and classical observers? The discussions leading to the most successful applications of quantum mechanics are a continuous source of reflection, from the early Einstein-Bohr controversy to Bell’s inequalities via the Bohmian interpretation of quantum theory. Quantum mechanics is not reducible either to a successful computational framework or to a philosophical perspective. It is, rather, a complicated mix of ideas that matured in one of the most difficult periods of European history. To understand quantum mechanics also means to understand the history of the first part of the 20th century: this is probably one of the main legacies, among others, of the life of Léon Rosenfeld.

● Massimo Giovannini, CERN and INFN Milan-Bicocca.

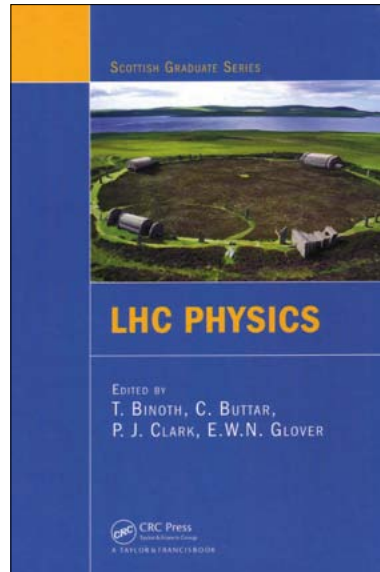
LHC Physics

By T Binoth, C Buttar, P J Clark and EWN Glover (eds.)

Taylor & Francis

Hardback: £76.99

LHC Physics collects the written versions of lectures delivered at the Scottish Universities Summer School in Physics that took place in August 2009, in St Andrews, and covers many relevant issues for people working on the analysis of LHC data. The first nine chapters include discussions about QCD, the Higgs, B physics, forward physics, quark–gluon plasma and physics



beyond the Standard Model, complemented by lectures on the LHC accelerator and detectors. The last three chapters cover Monte Carlo event-generators, statistics for high-energy-physics data analyses, and Grid computing. The lecturers are top-level experts and the book provides a nice introduction to many topics in high-energy physics, making it a valuable addition to many libraries around the world, including those of the hundreds of universities and institutes that participate in the LHC experiments.

The chapter on statistics is particularly useful as an introduction for the PhD students and postdocs who are heavily involved in data analyses. It addresses the relevance of Bayesian approaches and of the Markov-chain Monte Carlo tool, as well as the importance of providing results in the form of posterior probability distributions and how to deal properly with systematic uncertainties. It also overviews the topic of multivariate classifiers (with emphasis on “boosted decision trees”) and readers will probably appreciate the concluding remark that “while their use will no doubt increase as the LHC experiments mature, one should keep in mind that a simple analysis also has its advantages”.

Despite the book being published in 2012, it already seems somewhat old – a clear testimony to the amazing speed at which LHC results are being produced. Since the school took place, around

500 physics papers have been published by the LHC collaborations (a really impressive achievement), including many results that have significantly improved our understanding of most of the topics addressed in this book. While holding such summer schools is obviously important, one might wonder about the usefulness of the corresponding proceedings, especially when published more than two years after the school took place.

• Carlos Lourenço, CERN.

Books received

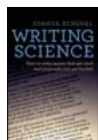
Writing Science: How to Write Papers That Get Cited and Proposals That Get Funded

By Joshua Schimel

Oxford University Press

Hardback: £60 \$99

Paperback: £22.50 \$35



Success is not necessarily defined by getting papers into print but by getting them into the reader's consciousness.

Writing Science is built on the idea that successful science writing tells a story. It shows scientists and

students how to present their research in a way that is clear and that will maximize reader comprehension. This book takes an integrated approach, using the principles of story structure to discuss every aspect of successful science writing, explaining how to write clear and professional sections, paragraphs and sentences. The final section deals with challenges such as how to discuss research limitations and write for the public.

Relativistic Cosmology

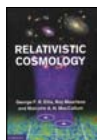
By George F R Ellis, Roy Maartens and

Malcolm A H MacCallum

Cambridge University Press

Hardback: £80 \$130

E-book: \$104



Using a relativistic geometric approach, this book focuses on the general concepts and relations that underpin the standard model of the universe.

Part I covers foundations of relativistic cosmology. Part II develops the dynamical and observational relations for all models of the universe based on general relativity. Part III focuses on the standard model of cosmology, including inflation,

dark matter, dark energy, perturbation theory, the cosmic microwave background, structure formation and gravitational lensing. It also examines modified gravity and inhomogeneity as possible alternatives to dark energy. Anisotropic and inhomogeneous models are described in Part IV, and Part V reviews deeper issues, such as quantum cosmology, the start of the universe and the multiverse.

Quantum Gravity (Third Edition)

By Claus Kiefer

Oxford University Press

Hardback: £65 \$117



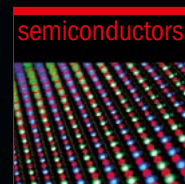
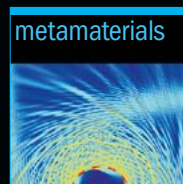
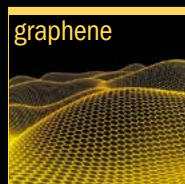
The search for a quantum theory of the gravitational field is one of the great open problems in theoretical physics. This book covers the two main approaches to its construction – the direct quantization of Einstein's general theory of relativity and string theory. There is a detailed presentation of the main approaches used in quantum general relativity: path-integral quantization, the background-field method and canonical quantum gravity in the metric, connection and loop formulations.

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