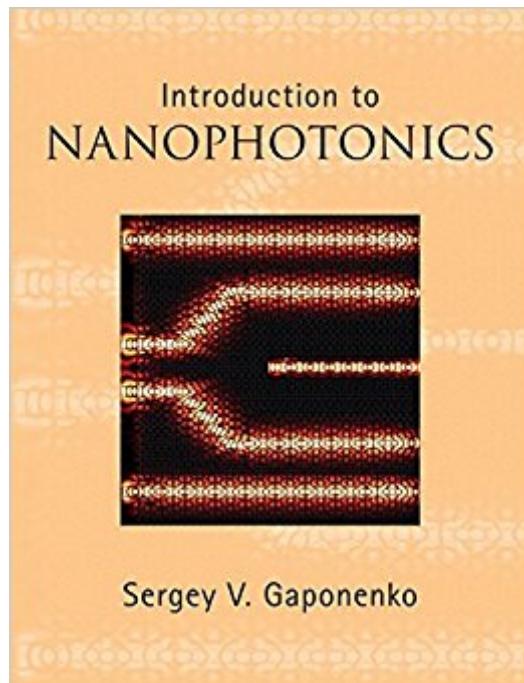


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# Introduction To Nanophotonics



## **Synopsis**

Nanophotonics is where photonics merges with nanoscience and nanotechnology, and where spatial confinement considerably modifies light propagation and light-matter interaction. Describing the basic phenomena, principles, experimental advances and potential impact of nanophotonics, this graduate-level textbook is ideal for students in physics, optical and electronic engineering and materials science. The textbook highlights practical issues, material properties and device feasibility, and includes the basic optical properties of metals, semiconductors and dielectrics. Mathematics is kept to a minimum and theoretical issues are reduced to a conceptual level. Each chapter ends in problems so readers can monitor their understanding of the material presented. The introductory quantum theory of solids and size effects in semiconductors are considered to give a parallel discussion of wave optics and wave mechanics of nanostructures. The physical and historical interplay of wave optics and quantum mechanics is traced. Nanoplasmonics, an essential part of modern photonics, is also included.

## **Book Information**

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## **Customer Reviews**

"Sergey Gaponenko has produced a breathtaking and timely book that is just perfect for graduate-level students, or for the senior person wanting to know more about the field. The book has just the right tone and covers the material with an experimental focus hitherto not seen."

Jonathan P. Dowling, Hearne Professor of Theoretical Physics and Co-Director, Hearne Institute for Theoretical Physics, Louisiana State University "This book plays with the beauty of analogies between electronic and photonic systems. The unconventional view on problems of modern science

will attract the readers' attention and interest. The book provides an excellent overview about the emerging field of nanophotonics for students and researchers in academia and industry." Ulrike Woggon, Technische Universitat Berlin"The clarity of nanophotonics concepts and their physical embodiment as presented by Professor Gaponenko, are the main assets of this excellent book. It thus provides a sound base to explore the potential of nanophotonics, to enable contributions to its future developments as a discipline and also to envisage applications. Essential reading for all practitioners of nanoscience and nanotechnology." Clivia M. Sotomayor Torres, Catalan Institute of Nanotechnology"This book is a tour de force: it takes the reader all the way from introductory wave physics to advanced topics involving the interaction between light and matter. Sprinkled throughout are descriptions of how physics developed in the 20th century, the connections between quantum physics and electromagnetic waves, and the author's views on these themes. " Martijn de Sterke, University of Sydney"There are several books that deal with selected aspects of this exciting and emerging field, but this is the first that covers nanophotonics in a comprehensive fashion. The treatment is rigorous, accessible and entertaining, so appeals to specialists and graduate students alike." Thomas F. Krauss, University of St. Andrews"This book is a logically well organized, rigorous, and comprehensive introduction to the broad and stimulating field of nanophotonics. Aiming at graduate-level students in physics, optical and electrical engineering as well as materials science, Prof. Gaponenko marvellously balances between the fundamental physical principles of electromagnetics, quantum mechanics and their technological applications to nano-optics and nanophotonics problems. State of the art research topics, such as nanoplasmatics, photonic crystals, and light waves in non-periodic complex media are rigorously presented in self-contained discussions that additionally offer thoughtful historical perspectives on the interplay and on the genesis of many physical and engineering concepts. Prof. Gaponenko has certainly written a profound and thoroughly engaging book that demonstrates his broad acquaintance with the experimental, theoretical and historical aspects of nanophotonics and nanotechnology. Anyone mastering the content of this book will be well prepared to understand and to actively engage in contemporary nanophotonics and nano-optics research." Luca Dal Negro, Dept of Electrical and Computer Engineering & Photonics Center, Boston University"The treatment is both rigorous and clear. The book is well illustrated and well organized, and the broad spectrum of topics treated here has been made easily accessible to readers." K. Alan Shore, Optics & Photonics News"Sergey Gaponenko expertly and comprehensively introduces the key concepts, theory, and experiments that reflect the beauty of the photonic nanoworld. Despite the field's diversity of topics, the book's presentation is logical, elegant, and delightful: Gaponenko presents a coherent journey through the

fundamental models and components of the subject as one could hope to read in any authoritative introduction to the field. He is well-qualified to do that, having spent a decade at the Institute of Molecular and Atomic Physics in Minsk, Belarus, where he generated an impressive list of nanophotonics-associated publications. Gaponenko demonstrates an effective style that engenders interest and provides genuine scientific clarity. I will certainly recommend it for the bookshelves of each of my students." Peter Vukusic, Physics Today

Describing the basic phenomena, principles, experimental advances and potential impact of nanophotonics, this graduate-level textbook is ideal for students in physics, optical and electronic engineering and materials science. Mathematics is kept to a minimum and theoretical issues are reduced to a conceptual level. Each chapter ends in problems.

Good read. The author tries to cover a large amount of information (significantly more than similar texts) and does a decent job. In particular the chapter titled "Light in non-periodic structures" is generally not covered and is a nice addition. Advanced undergraduates and beginning graduate students should be able to grasp most of the content. Serves as a very nice reference for those working in the field.

It was great !!!

Excellent

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