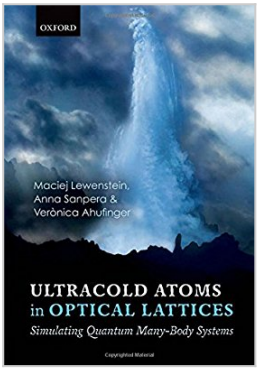

Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems

By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger

Download now

Read Online

Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger

Quantum computers, though not yet available on the market, will revolutionize the future of information processing. Quantum computers for special purposes like quantum simulators are already within reach. The physics of ultracold atoms, ions and molecules offer unprecedented possibilities of control of quantum many body systems and novel possibilities of applications to quantum information processing and quantum metrology. Particularly fascinating is the possibility of using ultracold atoms in lattices to simulate condensed matter or even high energy physics.

This book provides a complete and comprehensive overview of ultracold lattice gases as quantum simulators. It opens up an interdisciplinary field involving atomic, molecular and optical physics, quantum optics, quantum information, condensed matter and high energy physics. The book includes some introductory chapters on basic concepts and methods, and then focuses on the physics of spinor, dipolar, disordered, and frustrated lattice gases. It reviews in detail the physics of artificial lattice gauge fields with ultracold gases. The last part of the book covers simulators of quantum computers. After a brief course in quantum information theory, the implementations of quantum computation with ultracold gases are discussed, as well as our current understanding of condensed matter from a quantum information perspective.

Download Ultracold Atoms in Optical Lattices: Simulating qu ...pdf

Read Online Ultracold Atoms in Optical Lattices: Simulating ...pdf

Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems

By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger

Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger

Quantum computers, though not yet available on the market, will revolutionize the future of information processing. Quantum computers for special purposes like quantum simulators are already within reach. The physics of ultracold atoms, ions and molecules offer unprecedented possibilities of control of quantum many body systems and novel possibilities of applications to quantum information processing and quantum metrology. Particularly fascinating is the possibility of using ultracold atoms in lattices to simulate condensed matter or even high energy physics.

This book provides a complete and comprehensive overview of ultracold lattice gases as quantum simulators. It opens up an interdisciplinary field involving atomic, molecular and optical physics, quantum optics, quantum information, condensed matter and high energy physics. The book includes some introductory chapters on basic concepts and methods, and then focuses on the physics of spinor, dipolar, disordered, and frustrated lattice gases. It reviews in detail the physics of artificial lattice gauge fields with ultracold gases. The last part of the book covers simulators of quantum computers. After a brief course in quantum information theory, the implementations of quantum computation with ultracold gases are discussed, as well as our current understanding of condensed matter from a quantum information perspective.

Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger Bibliography

- Sales Rank: #2484435 in Books
- Published on: 2012-05-04
- Original language: English
- Number of items: 1
- Dimensions: 7.00" h x 1.20" w x 9.80" l, 2.50 pounds
- Binding: Hardcover
- 496 pages

Download Ultracold Atoms in Optical Lattices: Simulating qu ...pdf

Read Online Ultracold Atoms in Optical Lattices: Simulating ...pdf

Download and Read Free Online Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger

Editorial Review

Review

"This will be useful reading for students and researchers working in areas such as solid state physics, quantum mechanics, quantum optics and ultracold atom physics." --
Daniela Dragoman, full professor on the faculty of physics at the University of Bucharest, Romania

About the Author

Maciej Lewenstein, *Institucio Catalana de Recerca i Estudis Avancats (ICREA) and Institut de Ciencies Fotoniques (ICFO), Barcelona, Spain*,Anna Sanpera, *Institucio Catalana de Recerca i Estudits Avancats (ICREA) and Departament de Fisica, Universitat Autonoma de Barcelona, Spain*,Veronica Ahufinger, *Departament de Fisica, Universitat Autonoma de Barcelona, Spain*

Maciej Lewenstein has been an ICREA professor at the Institut de Ciencies Fotoniques in Castelldefels since 2005 where he leads the quantum optics theory group. In 2007 he won the Humbolt research award, Germany. In 2008 he obtained the Advance Research Grant from the European Community and in 2010 he won the first Harmburger Prize for his contributions in theoretical physics. His interests range from traditional quantum optics through to physics of cold gases and quantum information to physics of ultra intense laser fields.

Anna Sanpera has been an ICREA professor in the newly formed group of Quantum Information and Quantum Phenomena at the Universitat Autonoma of Barcelona, Spain, since 2005. She is currently working on quantum information theory, physics ultra-cold gases and the interface between quantum theory and condensed matter. She is also interested in the connection between quantum mechanics and biology.

Veronica Ahufinger obtained an ICREA researcher position in 2005 and moved to the Universitat Autonoma of Barcelona. Since 2010 she has been a professor at the Universitat Autonoma of Barcelona. She is interested in the interplay between the physics of ultracold atoms, quantum optics and condensed matter.

Users Review

From reader reviews:

Matthew Siller:

Reading a book can be one of a lot of action that everyone in the world likes. Do you like reading book thus. There are a lot of reasons why people like it. First reading a reserve will give you a lot of new facts. When you read a guide you will get new information due to the fact book is one of many ways to share the information or perhaps their idea. Second, reading through a book will make a person more imaginative. When you reading through a book especially fiction book the author will bring someone to imagine the story how the characters do it anything. Third, you can share your knowledge to other people. When you read this Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems, it is possible to tells your

family, friends as well as soon about yours guide. Your knowledge can inspire average, make them reading a guide.

Brandon Huff:

The reserve with title Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems has a lot of information that you can find out it. You can get a lot of gain after read this book. This particular book exist new information the information that exist in this guide represented the condition of the world today. That is important to yo7u to understand how the improvement of the world. This kind of book will bring you in new era of the the positive effect. You can read the e-book on your own smart phone, so you can read this anywhere you want.

Bessie Hall:

You can spend your free time to learn this book this book. This Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems is simple to bring you can read it in the area, in the beach, train and soon. If you did not have got much space to bring the actual printed book, you can buy often the e-book. It is make you easier to read it. You can save the actual book in your smart phone. Consequently there are a lot of benefits that you will get when you buy this book.

Anita Burns:

Don't be worry should you be afraid that this book may filled the space in your house, you may have it in e-book approach, more simple and reachable. This kind of Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems can give you a lot of buddies because by you checking out this one book you have thing that they don't and make you more like an interesting person. This particular book can be one of a step for you to get success. This guide offer you information that perhaps your friend doesn't understand, by knowing more than additional make you to be great people. So , why hesitate? We need to have Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems.

Download and Read Online Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger #FO0Z4H82CQY

Read Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger for online ebook

Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger books to read online.

Online Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger ebook PDF download

Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger Doc

Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger Mobipocket

Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger EPub

FO0Z4H82CQY: Ultracold Atoms in Optical Lattices: Simulating quantum many-body systems By Maciej Lewenstein, Anna Sanpera, Veronica Ahufinger