



# Experimental Atomic Physics

**Claude Cohen-Tannoudji, David Guery-  
Odelin**



## **Experimental Atomic Physics:**

**Experimental Atomic Physics** Gaylord Probasco Harnwell, John Jacob Livingood, 1988      **Experimental Atomic Physics** Gaylord Probasco Harnwell, John Jacob Livingood, 1961      **Experimental Atomic Physics** G. P. Harnwell, John Jacob Livingood, 1970      **Experimental Atomic Physics** Gaylord Probasco Harnwell, 1933  
*Experimental atomic physics* J.J. Livingood, 1933      Experimental Atomic Physics, by G. P. Harnwell...and J.J. Livingood...  
Gaylord Probasco Harnwell, John Jacob Livingood, 1933      **Atomic Physics: Precise Measurements and Ultracold Matter** Massimo Inguscio, Leonardo Fallani, 2013-09-19 This book traces the evolution of Atomic Physics from precision spectroscopy to the manipulation of atoms at a billionth of a degree above absolute zero Quantum worlds can be simulated and fundamental theories such as General Relativity and Quantum Electrodynamics can be tested with table top experiments  
**Atomic, Molecular, and Optical Physics: Charged Particles**, 1995-11-29 With this volume *Methods of Experimental Physics* becomes *Experimental Methods in the Physical Sciences* a name change which reflects the evolution of today's science This volume is the first of three which will provide a comprehensive treatment of the key experimental methods of atomic molecular and optical physics the three volumes as a set will form an excellent experimental handbook for the field The wide availability of tunable lasers in the past several years has revolutionized the field and led to the introduction of many new experimental methods that are covered in these volumes Traditional methods are also included to ensure that the volumes will be a complete reference source for the field      **Atomic and Quantum Physics** Hermann Haken, H.C. Wolf, 2012-12-06 A thorough knowledge of the physics of atoms and quanta is clearly a must for every student of physics but also for students of neighbouring disciplines such as chemistry and electrical engineering What these students especially need is a coherent presentation of both the experimental and the theoretical aspects of atomic and quantum physics Indeed this field could evolve only through the intimate interaction between ingenious experiments and an equally ingenious development of bold new ideas It is well known that the study of the microworld of atoms caused a revolution of physical thought and fundamental ideas of classical physics such as those on measurability had to be abandoned But atomic and quantum physics is not only a fascinating field with respect to the development of far reaching new physical ideas It is also of enormous importance as a basis for other fields For instance it provides chemistry with a conceptual basis through the quantum theory of chemical bonding Modern solid state physics with its numerous applications in communication and computer technology rests on the fundamental concepts first developed in atomic and quantum physics Among the many other important technical applications we mention just the laser a now widely used light source which produces light whose physical nature is quite different from that of conventional lamps In this book we have tried to convey to the reader some of the fascination which atomic and quantum physics still gives a physicist studying this field      **Atomic Physics 5** Richard Marrus, 2012-12-06 The Fifth International Conference on Atomic Physics was held July 26-30 1976 in Berkeley California

Invited talks were solicited which were representative of the most important developments since the fourth conference held in Heidelberg Germany in 1974 In this volume we have collected the manuscripts of the invited speakers in the belief that they represent a guide to contemporary research in atomic physics Experimental work on such topics as the search for parity violation spectroscopy and collision processes of fast highly stripped heavy ions exotic atoms high Rydberg states laser spectroscopy photoelectron spectroscopy and others are described The work described in these manuscripts is a clear measure of the continued vitality of our field One unhappy event since the last conference was the passing of Dr Victor William Bill Cohen 1911 1974 of Brookhaven National Laboratory Bill was one of the scientists who recognized early the need for personal communication among atomic physicists and was the prime mover in establishing the present international conference series Everyone who has enjoyed the stimulation of these conferences is indebted to Bill Cohen and we dedicate this volume of the proceedings to his memory

**Atomic Physics** Dmitry Budker, Derek F. Kimball, David P. DeMille, 2004 This book is intended for advanced undergraduate graduate students and researchers who are interested in Atomic Molecular and Optical AMO Physics Written as a collection of problems hints and solutions the book will provide help in learning about both fundamental and applied aspects of this vast field of knowledge where rapid and exciting developments are currently taking place The authors touch upon a broad spectrum of phenomena and techniques and adopt an experimentalists approach by avoiding formal calculations whenever possible in favor of back of the envelope estimates symmetry arguments and physical analogies While complete coverage of all AMO Physics is not attempted there are chapters on atomic structure behavior of atoms and molecules in external electromagnetic fields atomic collisions and experimental techniques Special attention is given to a discussion of ideas and experimental methods in several hot areas a few of these being cold atoms and Bose Einstein condensates tests of fundamental symmetries atomic magnetometers and frequency comb metrology with ultra short laser pulses

*Methods of Experimental Physics*. Patrick Richard, 1980

**Advances in Atomic, Molecular, and Optical Physics** Susanne Yelin, Louis F. Dimauro, Hélène Perrin, 2020-06-17 Advances in Atomic Molecular and Optical Physics Volume 69 the latest release in this ongoing series provides a comprehensive compilation of recent developments in a field that is in a state of rapid growth as new experimental and theoretical techniques are used on many problems both old and new Topics covered in this new release include Strong field ion spectroscopy Configurable microscopic optical potentials Polaritons Rydberg excitation of trapped cold ions a new platform for quantum technologies High intensity QED Recollision imaging and more Presents the work of international experts in the field Contains comprehensive articles that compile recent developments in a field that is experiencing rapid growth with new experimental and theoretical techniques emerging Ideal for users interested in optics excitons plasmas and thermodynamics Covers atmospheric science astrophysics and surface and laser physics amongst other topics

Topics in Atomic Physics Charles E. Burkhardt, Jacob J. Leventhal, 2006-07-30 The importance of the field of atomic physics to modern technology cannot be

overemphasized Atomic physics served as a major impetus to the development of the quantum theory of matter in the early part of the twentieth century and due to the availability of the laser as a laboratory tool it has taken us into the twenty-first century with an abundance of new and exciting phenomena to understand Our intention in writing this book is to provide a foundation for students to begin research in modern atomic physics The title implies it is not nor was it intended to be an all inclusive tome covering every aspect of atomic physics Any specialized textbook necessarily reflects the predilection of the authors toward certain aspects of the subject This one is no exception It reflects our belief that a thorough understanding of the unique properties of the hydrogen atom is essential to an understanding of atomic physics It also reflects our fascination with the distinguished position that Mother Nature has bestowed on the pure Coulomb and Newtonian potentials and thus hydrogen atoms and Keplerian bits Therefore we have devoted a large portion of this book to the hydrogen atom to emphasize this distinctiveness We attempt to stress the uniqueness of the attractive  $1/r$  potential without delving into group theory It is our belief that once an understanding of the hydrogen atom is achieved the properties of multielectron atoms can be understood as departures from hydrogenic properties

**Atomic Physics for Everyone** Will Raven, 2024-11-07 This open access textbook introduces beginning undergraduate students and high school students to the world of quantum mechanics and atomic spectroscopy Requiring no previous knowledge of physics and no math beyond basic algebra and sines and cosines this book focuses on concepts to make the excitement of atomic physics more accessible for learners than ever before It comes replete with learning goals exercises and solutions and an optional experimental component making this text readily adoptable for both the classroom and the undergraduate lab The book takes the reader on a lively and engaging tour through topics at the forefront of current science including photons quantum numbers atomic energy levels some different spectroscopy techniques electronic structure atomic notation angular momentum hyperfine structure isotope shifts the strong force an introduction to the Standard Model of Particle Physics and more This is an open access book

*Experimental Techniques in Nuclear and Particle Physics* Stefaan Tavernier, 2010-02-06 I have been teaching courses on experimental techniques in nuclear and particle physics to master students in physics and in engineering for many years This book grew out of the lecture notes I made for these students The physics and engineering students have rather different expectations of what such a course should be like I hope that I have nevertheless managed to write a book that can satisfy the needs of these different target audiences The lectures themselves of course need to be adapted to the needs of each group of students An engineering student will not question a statement like the velocity of the electrons in atoms is 1% of the velocity of light a physics student will Regarding units I have written factors  $h$  and  $c$  explicitly in all equations throughout the book For physics students it would be preferable to use the convention that is common in physics and omit these constants in the equations but that would probably be confusing for the engineering students Physics students tend to be more interested in theoretical physics courses However physics is an experimental science and physics students should understand how

experiments work and be able to make experiments work This is an open access book *Advances in Atomic Physics* Claude Cohen-Tannoudji, David Guery-Odelin, 2011 This book presents a comprehensive overview of the spectacular advances seen in atomic physics during the last 50 years The authors explain how such progress was possible by highlighting connections between developments that occurred at different times They discuss the new perspectives and the new research fields that look promising The emphasis is placed not on detailed calculations but rather on physical ideas Combining both theoretical and experimental considerations the book will be of interest to a wide range of students teachers and researchers in quantum and atomic physics *New Directions in Atomic Physics: Experiment*, 1972 **Topics in Atomic Physics** Charles E. Burkhardt, Jacob J. Leventhal, 2010-02-11 The importance of the field of atomic physics to modern technology cannot be overemphasized Atomic physics served as a major impetus to the development of the quantum theory of matter in the early part of the twentieth century and due to the availability of the laser as a laboratory tool it has taken us into the twenty-first century with an abundance of new and exciting phenomena to understand Our intention in writing this book is to provide a foundation for students to begin research in modern atomic physics The title implies it is not nor was it intended to be an all inclusive tome covering every aspect of atomic physics Any specialized textbook necessarily reflects the predilection of the authors toward certain aspects of the subject This one is no exception It reflects our belief that a thorough understanding of the unique properties of the hydrogen atom is essential to an understanding of atomic physics It also reflects our fascination with the distinguished position that Mother Nature has bestowed on the pure Coulomb and Newtonian potentials and thus hydrogen atoms and Keplerian orbits Therefore we have devoted a large portion of this book to the hydrogen atom to emphasize this distinctiveness We attempt to stress the uniqueness of the attractive  $1/r$  potential without delving into group theory It is our belief that once an understanding of the hydrogen atom is achieved the properties of multielectron atoms can be understood as departures from hydrogenic properties *Advanced Level Atomic Physics* G. M. Mossop, 1968

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