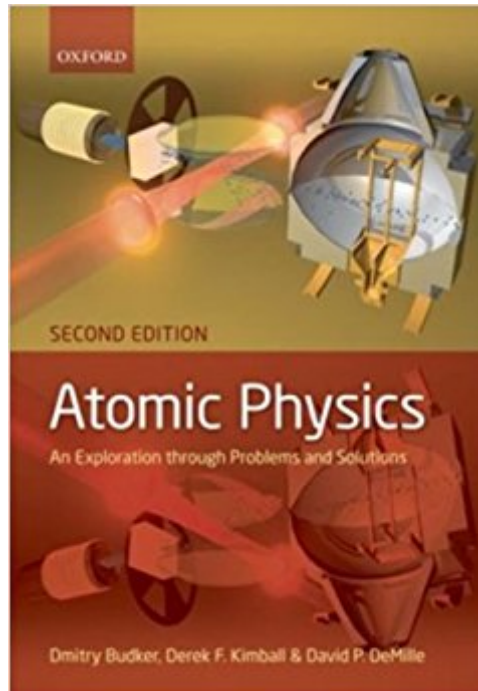




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# Atomic Physics: An Exploration Through Problems And Solutions



## Synopsis

This book provides a bridge between the basic principles of physics learned as an undergraduate and the skills and knowledge required for advanced study and research in the exciting field of atomic physics. The text is organized in a unique and versatile format --- as a collection of problems, hints, detailed solutions, and in-depth tutorials. This enables the reader to open the book at any page and get a solid introduction to subjects on the cutting edge of atomic physics, such as frequency comb metrology, tests of fundamental symmetries with atoms, atomic magnetometers, atom trapping and cooling, and Bose-Einstein condensates. The text also includes problems and tutorials on important basics that every practicing atomic physicist should know, but approached from the perspective of experimentalists: formal calculations are avoided where possible in favor of 'back-of-the-envelope' estimates, symmetry arguments, and physical analogies. The 2nd edition contains over 10 new problems, and includes important updates, revisions, and corrections of several problems of the 1st edition.

## Book Information

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## Customer Reviews

'A remarkable book, indeed, greatly exceeding our expectations. [...] The authors are truly taken by the logic, beauty, and harmonious diversity of atomic-physics phenomena and are offering to share their knowledge and insights with the reader.' From Preface to the Russian edition, by V.S. Zapaskii (translator) and E.B. Alexandrov (editor)

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of California at Berkeley (1993), American Physical Society Award for Outstanding Doctoral Thesis Research in Atomic, Molecular and Optical Physics (1994), National Science Foundation Career Award (1998), Miller Research Professorship (2002-2003), Elected Fellow of the American Physical Society (2005), R&D 100 Award for Laser Detected Magnetic-Resonance Imaging (2007). Derek F. Kimball Department of Physics California State University - East Bay Ph. D. from the University of California at Berkeley (2005), Departmental Citation in Physics, University of California at Berkeley (1998). David P. DeMille Physics Department Yale University Ph. D. from the University of California at Berkeley (1994), Elected Fellow of the American Physical Society (2005), Francis M. Pipkin Award (2007).

The title says it all. Its full of hand-waving arguments and formulas pulled from thin air. One learns nothing by reading this book.

Any time you want to get a quick introduction to a new subject in atomic physics, this book is the perfect place to start. Especially if you're an experimentalist. Do note that this book is written for those who have finished the basic undergraduate curriculum (quantum, E&M, etc.). One of the nice things about the text is that each problem and solution is self-contained so that if you want to learn, say, about frequency combs, you can just skip ahead to read and work on the problem on frequency combs. Great reference!

This book is not a typical textbook and as such may be hard to learn from as a first text on your own. To aid these readers, many problems are indicated as Tutorials and cover a topic in a more introductory way. With a course lecture, or as a supplemental text it works well, and it is best suited for students familiar with the basics but looking for ways to tackle advanced topics that come directly from the lab. I keep this book nearby and turn to it often as a way to get some practice and fill in the gaps in my understanding of this broad (and growing) field. Very few books present "theory for experimentalists" but this book succeeds at doing exactly that.

Lots of valuable nuggets in this book. Particularly useful for grad students and above doing experimental research in atomic physics.

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