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## Abstract

This book is based on lectures on quantum theory given by the author to third-year students in the Physics Department of the University of Ioannina during the years 2012-2014. It is intended for students who have a basic knowledge of differential equations, wave mechanics, and classical mechanics. There is already a fairly extensive bibliography of quantum mechanics textbooks in Greek and internationally. The innovation of this effort focuses on the following: The written text is accompanied by video lectures posted on the Internet, and the relevant links are provided at the end of each chapter. These video lectures have been recorded by the author constitute the regular lectures given as part of the compulsory semester courses Quantum Theory I and Quantum Theory II and are aimed at third-year students of the Department of Physics at the University of Ioannina. These lectures present a more detailed analysis of the topics, which in practice has proven to be quite useful for students who attended the courses. During the video lectures, simple exercises are proposed to students, many of which are also included in the written text. The written text is accompanied by

the lecture slides in pdf format, which in themselves constitute a concise presentation of the contents, useful for a first reading, but also for a review of the material. Each chapter is accompanied by solved exercises, unsolved exercises, and (for most chapters) multiple-choice exercises, accompanied by an explanation of the correct answer. This provides students with a wide variety of applications of the material taught. The theoretical topics are analyzed as simply and concisely as possible, with an emphasis on the essentials and avoiding lengthy discussions, which, although enlightening, can sometimes be tedious and distract from the main point. The topics covered are comprehensive enough to cover the material of a one-year undergraduate course in quantum mechanics or two six-month courses. Dirac notation is introduced early on and used throughout much of the book so that students can understand the representation of the position as a special case of the more general formalism. Topics that appear mainly in more advanced or graduate courses, such as transformations of quantum states and operators and addition of angular momenta, are also covered briefly.



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