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<<量子力学题解>>

图书基本信息

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前言

Quantum mechanics is an endless source of new questions and fascinating observations. Examples can be found in fundamental physics and in applied physics, in mathematical questions as well as in the currently popular debates on the interpretation of quantum mechanics and its philosophical implications.Teaching quantum mechanics relies mostly on theoretical courses, which are illustrated by simple exercises often of a mathematical character. Reducing quantum physics to this type of problem is somewhat frustrating since very few, if any, experimental quantities are available to compare the results with. For a long time, however, from the 1950s to the 1970s, the only alternative to these basic exercises seemed to be restricted to questions originating from atomic and nuclear physics, which were transformed into exactly soluble problems and related to known higher transcendental functions.In the past ten or twenty years, things have changed radically. The devel- opment of high technologies is a good example. The one-dimensional square- well potential used to be a rather academic exercise for beginners. The emer- gence of quantum dots and quantum wells in semiconductor technologies has changed things radically. Optronics and the associated developments in infra- red semiconductor and laser technologies have considerably elevated the social rank of the square-well model. As a consequence, more and more emphasis is given to the physical aspects of the phenomena rather than to analytical or computational considerations.Many fundamental questions raised since the very beginnings of quantum theory have received experimental answers in recent years. A good example is the neutron interference experiments of the 1980s, which gave experimental answers to 50 year old questions related to the measurability of the phase of the wave function. Perhaps the most fundamental example is the experimen- tal proof of the violation of Bell's inequality, and the properties of entangled states, which have been established in decisive experiments since the late 1970s, More recently, the experiments carried out to quantitatively verify decoherence effects and "SchrSdinger-cat" situations have raised considerable.

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内容概要

《量子力学题解：量子理论在现在物理中的应用(第2版)》方式独特地展示了量子力学基本原理在原子分子物理、凝聚态物理、光学、量子信息和量子计算等学科中的应用。
书中习题与现代量子力学实验和理论联系密切，部分题目有一定难度，可以深化读者对物理概念的理解，为从事更深入的科学研究打下坚实的基础。

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章节摘录

插图：The Ecole Polytechnique, one of France's top academic institutions, has a longstand- ing tradition of producing exceptional scientific textbooks for its students. The origi- nal lecture notes, the Cours de l'Ecole Polytechnique, which were written by Cauchy and Jordan in the nineteenth century, are considered to be landmarks in the develop- ment of mathematics.The present series of textbooks is remarkable in that the texts incorporate the most recent scientific advances in courses designed to provide undergraduate students with the foundations of a scientific discipline. An outstanding level of quality is achieved in each of the seven scientific fields taught at the Ecole: pure and applied mathe- matics, mechanics, physics, chemistry, biology, and economics. The uniform level of excellence is the result of the unique selection of academic staff there which in- cludes, in addition to the best researchers in its own renowned laboratories, a large number of world-famous scientists, appointed as part-time professors or associate professors, who work in the most advanced research centers France has in each field.Another distinctive characteristic of these courses is their overall consistency; each course makes appropriate use of relevant concepts introduced in the other textbooks. This is because each student at the Ecole Polytechnique has to acquire basic knowl- edge in the seven scientific fields taught there, so a substantial link between depart- ments is necessary. The distribution of these courses used to be restricted to the 900 students at the Ecole. Some years ago we were very successful in making these courses available to a larger French-reading audience. We now build on this success by making these textbooks also available in English.

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