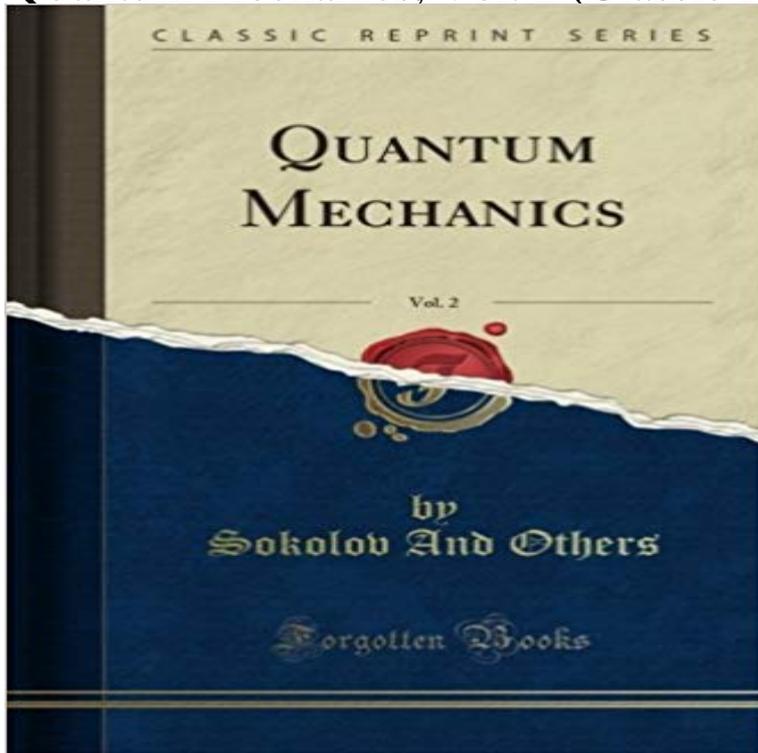


Quantum Mechanics, Vol. 2 (Classic Reprint)



The following computer-generated description may contain errors and does not represent the quality of the book. Preface This textbook is based on my lectures to students at the Moscow Regional Pedagogical Institute (1945 to 1948) and Moscow University from 1945 on. In writing this book we set ourselves the difficult task of treating in a single volume the fundamentals of atomic theory, that is, Schrodinger's nonrelativistic theory, Dirac's relativistic theory, the theory of multielectron atoms, and the basic applications of quantum mechanics to solid state physics. Our aim was to combine the exposition of general theoretical principles with examples of the application of quantum mechanics to specific problems connected with atomic structure. To avoid overloading this book, we have abridged the treatment of certain specialized topics, but in such cases we have endeavored to supply references to standard works on the subject. In most textbooks the solution of specific problems with the help of Schrodinger's equation is handled in fairly elegant form. The basic mathematical tools required for this purpose are a knowledge of second-order differential equations and various special functions (including the Hermite, Legendre and Laguerre polynomials). However, applications of Dirac's theory to specific problems (such as the hydrogen atom) are on the whole handled less satisfactorily. In some cases the calculations are so long and cumbersome that it is difficult to perceive the physical meaning of the solutions. In others there is no actual derivation of the results or only a rough proof is given. In an attempt to avoid these pitfalls, we have used an approximate form of Dirac's equation for our treatment of the hydrogen atom (Chapter 19). This approximation still enables us to obtain the formula for the fine structure of the energy levels and the selection rules (Chapter 18 and 20). Our

analysis of the Lamb shift due to the electronpositron vacuum is also somewhat simplified (Chapter22). Several good problem books in quantum mechanics are available, and therefore we shall consider only a few problems chosen with the aim of elucidating and supplementing the general discussion. The first part of this book was written jointly by me and Yu. M.Loskutov, and the second part jointly by me and I.M. Ternov. Great assistance was rendered by M.M. Kolesnikova in condensing notes based on my lectures on quantum mechanics and in preparing the manuscript for the press.This book is a reproduction of an important historical work. Forgotten Books uses state-of-the-art technology to digitally-enhance the work, preserving the original format whilst repairing imperfections present in the aged copy. In rare cases, an imperfection in the original, such as a blemish or missing page, may be replicated in our edition. We do, however, repair the vast majority of imperfections successfully; any imperfections that remain are intentionally left to preserve the state of such historical works.Tags: electron energy equation function quantum wave theory atom particle value spin field solution term obtain mechanic momentum potential operator form

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