1. Record Nr. UNINA9910782271003321

Autore	Froman Nanny
Titolo	Stark effect in a hydrogenic atom or ion [[electronic resource]] : treated by the phase-integral method / / Nanny Froman, Per Olof Froman ; with adjoined papers by A. Hokback and P.O. Froman
Pubbl/distr/stampa	London, : Imperial College Press Hackensack, NJ, : Distributed by World Scientific Publishing, c2008
ISBN	1-281-86768-3 9786611867683 1-86094-925-8
Descrizione fisica	1 online resource (164 p.)
Altri autori (Persone)	FromanPer Olof
Disciplina	530.12
Soggetti	Stark effect Optical spectroscopy Quantum theory Schrodinger equation
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. 145-148) and indexes.
Nota di contenuto	Contents; Preface; 1 Introduction; Brief review of different aspects studied and various methods used; Brief account of the background of this book; Publications with relevance to this book; Treatment in this book; Brief account of the contents of this book; 2 Schrodinger Equation, its Separation and its Exact Eigenfunctions; 2.1 Separation of the time-independent Schrodinger equation for the internal motion; 2.2 Properties of the eigenfunctions of the time-independent Schrodinger equation for the internal motion; 3 Development in Time of the Probability Amplitude for a Decaying State 4 Phase-Integral Method 4.1 Phase-integral approximation generated from an unspecified base function; 4.2 Connection formulas associated with a single transition point; 4.2.1 Connection formulas pertaining to a first-order transition zero on the real axis; 4.2.2 Connection formula pertaining to a first-order transition pole at the origin; 4.3 Connection formula for a real, smooth, single-hump potential barrier; 4.3.1 Wave function given as a standing wave; 4.3.2 Supplementary quantity ; 4.4

Quantization conditions for single-well potentials

5 Derivation of Phase-Integral Formulas for Profiles, Energies and Half-Widths of Stark Levels5.1 Positions of the Stark levels; 5.2 Formulas for the calculation of dL/dE, dK2n/dE and dK/dE; 5.3 Half-widths of the Stark levels; 6 Procedure for Transformation of the Phase-Integral Formulas into Formulas Involving Complete Elliptic Integrals; Adjoined Papers by Anders Hokback and Per Olof Froman; 7 Phase-Inegral Quantities and Their Partial Derivatives with Respect to E and Z1 Expressed in Terms of Complete Elliptic Integrals; 7.1 The -equation; 7.2 The -equation in the sub-barrier case

7.3 The -equation in the super-barrier case8 Numerical Results; References; Name Index; Subject Index

Sommario/riassunto

This book treats the Stark effect of a hydrogenic atom or ion in a homogeneous electric field. It begins with a thorough review of previous work in this field since 1926. After the Schrodinger equation has been separated with respect to time dependence, centre of mass motion and internal motion, followed by a discussion of its eigenfunctions, the exact development in time of the probability amplitude for a decaying state is obtained by means of a formula analogous to the Fock-Krylov theorem. From this formula one obtains by means of the phase-integral approximation generated from a particular