# Semiclassical Mechanics with Molecular Applications

M. S. CHILLD



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# **Semiclassical Mechanics With Molecular Applications**

M. S. Child

#### **Semiclassical Mechanics With Molecular Applications:**

**Semiclassical Mechanics with Molecular Applications** M. S. Child,2014 The second edition of a comprehensive text designed for advanced graduate courses in quantum mechanics The title word semiclassical highlights the novelty of the work which emphasizes the influence of classical mechanics on the behaviour of quantum mechanical systems

Semiclassical Mechanics with Molecular Applications Mark Sheard Child, 2023 Relates Newton's classical theory to modern quantum mechanics in a manner designed for the interpretation of experiments This book gives a comprehensive account of the application of the theory to molecular systems with particular attention paid to the problems of non **Introduction to Quantum Mechanics** David Tannor, 2008-02-01 Introduction to Quantum Mechanics is a separability completely original manifesto covering quantum mechanics from a time dependent perspective in a unified way from beginning to end This text will change the way people think about and teachabout quantum mechanics in chemistry and physics departments This brilliant new text a completely original manifesto covers quantum mechanics from a time dependent perspective in a unified way from beginning to end Intended for upper level undergraduate and graduate courses in quantum mechanics this text will change the way people think about and teach about quantum mechanics in chemistry and Theory and Application of Quantum Molecular Dynamics John Z. H. Zhang, 1999 This book physics departments gives an updated and detailed presentation of modern quantum mechanical treatments and practical computational methods for dynamical processes of small molecular systems. The main emphasis is on the recent development of successful theories and computational methods for the reactive scattering process Specific applications are given in detail for a number of benchmark chemical reaction systems in the gas phase and gas surface Differing from traditional physics books focusing on abstract collision theory for elastic collisions the book has been written in a fashion in which the development of general reactive or rearrangement scattering theory is accompanied by practical applications for realistic reaction systems

Nonlinear Hamiltonian Mechanics Applied to Molecular Dynamics Stavros C. Farantos, 2014-09-22 This brief presents numerical methods for describing and calculating invariant phase space structures as well as solving the classical and quantum equations of motion for polyatomic molecules Examples covered include simple model systems to realistic cases of molecules spectroscopically studied Vibrationally excited and reacting molecules are nonlinear dynamical systems and thus nonlinear mechanics is the proper theory to elucidate molecular dynamics by investigating invariant structures in phase space Intramolecular energy transfer and the breaking and forming of a chemical bond have now found a rigorous explanation by studying phase space structures —, Encyclopedia of Chemical Physics and Physical Chemistry John H. Moore, Nicholas D. Spencer, 2023-07-03 The Encyclopedia of Physical Chemistry and Chemical Physics introduces possibly unfamiliar areas explains important experimental and computational techniques and describes modern endeavors The encyclopedia quickly provides the basics defines the scope of each subdiscipline and indicates where to go for a more

complete and detailed explanation Particular attention has been paid to symbols and abbreviations to make this a user friendly encyclopedia Care has been taken to ensure that the reading level is suitable for the trained chemist or physicist The encyclopedia is divided in three major sections FUNDAMENTALS the mechanics of atoms and molecules and their interactions the macroscopic and statistical description of systems at equilibrium and the basic ways of treating reacting systems The contributions in this section assume a somewhat less sophisticated audience than the two subsequent sections At least a portion of each article inevitably covers material that might also be found in a modern undergraduate physical chemistry text METHODS the instrumentation and fundamental theory employed in the major spectroscopic techniques the experimental means for characterizing materials the instrumentation and basic theory employed in the study of chemical kinetics and the computational techniques used to predict the static and dynamic properties of materials APPLICATIONS specific topics of current interest and intensive research For the practicing physicist or chemist this encyclopedia is the place to start when confronted with a new problem or when the techniques of an unfamiliar area might be exploited For a graduate student in chemistry or physics the encyclopedia gives a synopsis of the basics and an overview of the range of activities in which physical principles are applied to chemical problems It will lead any of these groups to the salient points of a new field as rapidly as possible and gives pointers as to where to read about the topic in more detail **Molecular Quantum** Mechanics Peter W. Atkins, Ronald S. Friedman, 2011 This text unravels those fundamental physical principles which explain how all matter behaves It takes us from the foundations of quantum mechanics through quantum models of atomic molecular and electronic structure and on to discussions of spectroscopy and the electronic and magnetic properties of molecules

Introduction To Nonadiabatic Dynamics Hiroki Nakamura,2019-09-26 Nonadiabatic transition is a highly multi disciplinary concept and phenomenon constituting a fundamental mechanism of state and phase changes in various dynamical processes of physics chemistry and biology This book is intended to be readable to a broad audience so that they can deepen their understanding of the basic concepts of both time independent and time dependent nonadiabatic transitions Quantum mechanically intriguing phenomena such as complete reflection and nonadiabatic tunneling are emphasized The Zhu Nakamura theory that can deal with non negligible classically forbidden transitions is explained Furthermore by controlling nonadiabatic transitions induced by an external field such as laser designing chemical reaction dynamics as we desire is shown to be theoretically possible 
Unimolecular Reaction Dynamics Tomas Baer, William L. Hase, 1996-06-27 This book provides a penetrating and comprehensive description of energy selected reactions from a theoretical as well as experimental view Three major aspects of unimolecular reactions involving the preparation of the reactants in selected energy states the rate of dissociation of the activated molecule and the partitioning of the excess energy among the final products are fully discussed with the aid of 175 illustrations and over 1 000 references most from the recent literature Examples of both neutral and ionic reactions are presented Many of the difficult topics are discussed at several levels of

sophistication to allow access by novices as well as experts Among the topics covered for the first time in monograph form is a discussion of highly excited vibrational rotational states and intramolecular vibrational energy redistribution Problems associated with the application of RRKM theory are discussed with the aid of experimental examples Detailed comparisons are also made between different statistical models of unimolecular decomposition Both quantum and classical models not based on statistical assumptions are described Finally a chapter devoted to the theory of product energy distribution includes the application of phase space theory to the dissociation of small and large clusters The work will be welcomed as a valuable resource by practicing researchers and graduate students in physical chemistry and those involved in the study of chemical reaction dynamics

#### Semiclassical Mechanics With Molecular Applications Book Review: Unveiling the Magic of Language

In an electronic era where connections and knowledge reign supreme, the enchanting power of language has be apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is truly remarkable. This extraordinary book, aptly titled "Semiclassical Mechanics With Molecular Applications," published by a very acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound effect on our existence. Throughout this critique, we shall delve in to the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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# **Semiclassical Mechanics With Molecular Applications Introduction**

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