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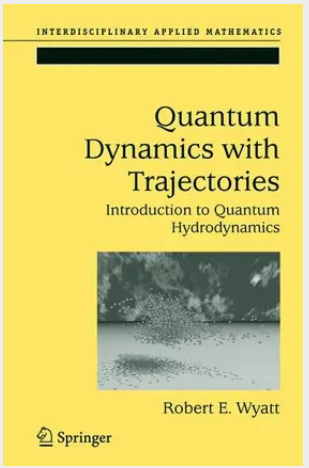
Quantum Dynamics with Trajectories

Introduction to Quantum Hydrodynamics

Remarkable progress has recently been made in the application of quantumtrajectories as the computational tool for solving quantum mechanical problems. This is the first book to present these developments in the broader context of the hydrodynamical formulation of quantum dynamics. In addition to a thorough discussion of the quantum trajectory equations of motion, there is considerable material that deals with phase space dynamics, adaptive moving grids, electronic energy transfer, and trajectories for stationary states.

On the pedagogical side, a number of sections of this book will be accessible to students who have had an introductory quantum mechanics course. There is also considerable material for advanced researchers, and chapters in the book cover both methodology and applications. The book will be useful to students and researchers in physics, chemistry, applied math, and computational dynamics.

Remarkable progress has recently been made in the development and application of quantum trajectories as the computational tool for solving the time dependent Schrodinger equation. Analogous methods for stationary bound states are also being developed. The purpose of this book is to present recent developments and applications of quantum trajectory methods in the broader context of the hydrodynamical formulation of quantum dynamics. While many chapters of the book deal with Lagrangian quantum trajectories in which the velocity matches that of the probability fluid, other chapters deal with what will be termed post-Lagrangian trajectories. There are also many state-of-the-art topics covered that are unique to this book. On the pedagogical side, a number of sections will be accessible to students who have had at least one course in quantum dynamics. There is also considerable material for advanced researchers, and chapters in the book cover both methodology and applications.



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