

1. Record Nr.	UNINA9910822078203321
Autore	Weiss U (Ulrich)
Titolo	Quantum dissipative systems // Ulrich Weiss
Pubbl/distr/stampa	Singapore ; ; Hackensack, N.J., : World Scientific, c2008
ISBN	1-281-93400-3 9786611934002 981-279-179-5
Edizione	[3rd ed.]
Descrizione fisica	1 online resource (527 p.)
Collana	Series in modern condensed matter physics ; ; v. 13
Disciplina	530.12
Soggetti	Quantum theory Mathematical physics Thermodynamics Path integrals
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. 483-501) and index.
Nota di contenuto	Contents; Preface; Preface to the Second Edition; Acknowledgements; Preface to the First Edition; 1 Introduction; I GENERAL THEORY OF OPEN QUANTUM SYSTEMS; 2 Diverse limited approaches: a brief survey; 2.1 Langevin equation for a damped classical system; 2.2 New schemes of quantization; 2.3 Traditional system-plus-reservoir methods; 2.3.1 Quantum-mechanical master equations for weak coupling; 2.3.2 Operator Langevin equations for weak coupling; 2.3.3 Quantum and quasiclassical Langevin equation; 2.3.4 Phenomenological methods; 2.4 Stochastic dynamics in Hilbert space 3 System-plus-reservoir models 3.1 Harmonic oscillator bath with linear coupling; 3.1.1 The Hamiltonian of the global system; 3.1.2 The road to the classical generalized Langevin equation; 3.1.3 Phenomenological modeling; 3.1.4 Quasiclassical Langevin equation; 3.1.5 Ohmic and frequency-dependent damping; 3.1.6 Rubin model; 3.2 The Spin-Boson model; 3.2.1 The model Hamiltonian; 3.2.2 Josephson two-state systems: flux and charge qubit; 3.3 Microscopic models; 3.3.1 Acoustic polaron: one-phonon and two-phonon coupling; 3.3.2 Optical polaron 3.3.3 Interaction with fermions (normal and superconducting) 3.3.4 Superconducting tunnel junction; 3.4 Charging and environmental

effects in tunnel junctions; 3.4.1 The global system for single electron tunneling; 3.4.2 Resistor, inductor and transmission lines; 3.4.3 Charging effects in Josephson junctions; 3.5 Nonlinear quantum environments; 4 Imaginary-time path integrals; 4.1 The density matrix: general concepts; 4.2 Effective action and equilibrium density matrix; 4.2.1 Open system with bilinear coupling to a harmonic reservoir; 4.2.2 State-dependent memory-friction; 4.2.3 Spin-boson model; 4.2.4 Acoustic polaron and defect tunneling: one-phonon coupling; 4.2.5 Acoustic polaron: two-phonon coupling; 4.2.6 Tunneling between surfaces: one-phonon coupling; 4.2.7 Optical polaron; 4.2.8 Heavy particle in a metal; 4.2.9 Heavy particle in a superconductor; 4.2.10 Effective action for a Josephson junction; 4.2.11 Electromagnetic environment; 4.3 Partition function of the open system; 4.3.1 General path integral expression; 4.3.2 Semiclassical approximation; 4.3.3 Partition function of the damped harmonic oscillator; 4.3.4 Functional measure in Fourier space; 4.3.5 Partition function of the damped harmonic oscillator revisited; 4.4 Quantum statistical expectation values in phase space; 4.4.1 Generalized Weyl correspondence; 4.4.2 Generalized Wigner function and expectation values; 5 Real-time path integrals and dynamics; 5.1 Feynman-Vernon method for a product initial state; 5.2 Decoherence and friction; 5.3 General initial states and preparation function; 5.4 Complex-time path integral for the propagating function; 5.5 Real-time path integral for the propagating function; 5.5.1 Extremal paths; 5.5.2 Classical limit; 5.5.3 Semiclassical limit: quasiclassical Langevin equation

Sommario/riassunto

Major advances in the quantum theory of macroscopic systems, in combination with stunning experimental achievements, have brightened the field and brought it to the attention of the general community in natural sciences. Today, working knowledge of dissipative quantum mechanics is an essential tool for many physicists. This book - originally published in 1990 and republished in 1999 as an enlarged second edition - delves much deeper than ever before into the fundamental concepts, methods, and applications of quantum dissipative systems, including the most recent developments. In this third e
