

1. Record Nr.	UNINA9910830996703321
Autore	Shapiro Moshe
Titolo	Quantum control of molecular processes [[electronic resource] /] / Moshe Shapiro, Paul Brumer
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, c2012
ISBN	3-527-63972-1 3-527-63970-5 3-527-63971-3
Edizione	[2nd, rev. and enl. ed.]
Descrizione fisica	1 online resource (1078 p.)
Classificazione	530 5307 UH 5680 VE 5650
Altri autori (Persone)	BrumerPaul ShapiroMoshe
Disciplina	535.2 535/.2
Soggetti	Quantum optics Coherence (Optics) Molecular dynamics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	First ed. published as: Principles of the quantum control of molecular processes. Hoboken, N.J. : Wiley-Interscience, c2003.
Nota di bibliografia	Includes bibliographical references (p. 513-535) and index.
Nota di contenuto	Cover; Half Title page; Related Titles; Title page; Copyright page; Dedication; Preface to the Second Edition; Preface to the First Edition; Chapter 1: Preliminaries of the Interaction of Light with Matter; Chapter 2: Weak-Field Photodissociation; 2.1 Photoexcitation of a Molecule with a Pulse of Light; 2.2 State Preparation During the Pulse; 2.3 Photodissociation; 2.A Appendix: Molecular State Lifetime in Photodissociation; Chapter 3: Weak-Field Coherent Control; 3.1 Traditional Excitation; 3.2 Photodissociation from a Superposition State; 3.3 The Principle of Coherent Control 3.4 Interference between 3.5 Polarization Control of Differential Cross Sections; 3.6 Pump-Dump Control: Few Level Excitation; 3.A Appendix: Mode-Selective Chemistry; Chapter 4: Control of Intramolecular Dynamics; 4.1 Intramolecular Dynamics; Chapter 5: Optimal Control

Theory; 5.1 Pump-Dump Excitation with Many Levels: the Tannor-Rice Scheme; 5.2 Optimal Control Theory; Chapter 6: Decoherence and Its Effects on Control; 6.1 Decoherence; 6.2 Sample Computational Results on Decoherence; 6.3 Environmental Effects on Control: Some Theorems; 6.4 Decoherence and Control
 6.5 Countering Partially Coherent Laser Effects in Pump-Dump Control
 6.6 Countering CW Laser Jitter; Chapter 7: Case Studies in Coherent Control; 7.1 Two-Photon vs. Two-Photon Control; 7.2 Control over the Refractive Index; 7.3 The Molecular Phase in the Presence of Resonances; 7.4 Control of Chaotic Dynamics; Chapter 8: Coherent Control of Bimolecular Processes; 8.1 Fixed Energy Scattering: Entangled Initial States; 8.2 Time Domain: Fast Timed Collisions; Chapter 9: The Interaction of Light with Matter: a Closer Look; 9.1 Classical Electrodynamics of a Pulse of Light
 9.2 The Dynamics of Quantized Particles and Classical Light Fields
 Chapter 10: Coherent Control with Quantum Light; 10.1 The Quantization of the Electromagnetic Field; 10.2 Quantum Light and Quantum Interference; 10.3 Quantum Field Control of Entanglement; 10.4 Control of Entanglement in Quantum Field Chiral Separation; Chapter 11: Coherent Control beyond the Weak-Field Regime: Bound States and Resonances; 11.1 Adiabatic Population Transfer; 11.2 An Analytic Solution of the Nondegenerate Quantum Control Problem; 11.3 The Degenerate Quantum Control Problem
 11.4 Adiabatic Encoding and Decoding of Quantum Information
 11.5 Multistate Piecewise Adiabatic Passage; 11.6 Electromagnetically Induced Transparency; Chapter 12: Photodissociation Beyond the Weak-Field Regime; 12.1 One-Photon Dissociation with Laser Pulses; 12.2 Computational Examples; Chapter 13: Coherent Control Beyond the Weak-Field Regime: the Continuum; 13.1 Control over Population Transfer to the Continuum by Two-Photon Processes; 13.2 Pulsed Incoherent Interference Control; 13.3 Resonantly Enhanced Photoassociation; 13.4 Laser Catalysis
 Chapter 14: Coherent Control of the Synthesis and Purification of Chiral Molecules

Sommario/riassunto

Written by two of the world's leading researchers in the field, this is a systematic introduction to the fundamental principles of coherent control, and to the underlying physics and chemistry. This fully updated second edition is enhanced by 80% and covers the latest techniques and applications, including nanostructures, attosecond processes, optical control of chirality, and weak and strong field quantum control. Developments and challenges in decoherence-sensitive condensed phase control as well as in bimolecular control are clearly described. Indispensable for atomic, molecular and c