



Principles of the Quantum Control of Molecular Processes

Paul W. Brumer, Moshe Shapiro

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Principles and Applications of Quantum Control

Over the past fifteen years, significant developments have been made in utilizing quantum attributes of light and matter to assume unprecedented control over the dynamics of atomic and molecular systems. This growth reflects a confluence of factors including the maturation of quantum mechanics as a tool for chemistry and physics, the development of new laser devices increasing our ability to manipulate light, and the recognition that coherent laser light can be used to imprint information on atoms and molecules for practical purposes. Written by two of the world's leading researchers in the field, *Principles of the Quantum Control of Molecular Processes* offers a systematic introduction to the fundamental principles of coherent control, and to the physics and chemistry necessary to master it.

Designed as both a resource for self-study and as a graduate textbook, this survey of the subject provides a step-by-step discussion of light-matter interactions along with coverage of such essential topics as:

- * Molecular dynamics and control
- * The dynamics of photodissociation
- * Bimolecular collision processes
- * The control of chirality and asymmetric synthesis
- * Application of control using moderate and strong fields
- * Tuning the system and laser parameters to achieve optimal control
- * Decoherence and methods for countering it

Both authoritative and comprehensive, this first in-depth treatment of coherent control is destined to become the standard reference in an increasingly influential field.

PAUL W. BRUMER, PhD, is University Professor-Theoretical Chemical Physics and holds the Roel Buck Chair in Chemical Physics at the University of Toronto. He received his BSc. from Brooklyn College and his PhD from Harvard University.

MOSHE SHAPIRO, PhD, is the Jacques Mimran Professor of Chemical Physics at the Weizmann Institute of Science, Rehovot, Israel, and a Professor of Chemistry and Physics at the University of British Columbia. He received his BSc, MSc, and PhD from the Hebrew University of Jerusalem.

The authors are among the cofounders of the field of coherent control. They have published extensively on this and related subjects in chemical physics, and have received numerous awards and worldwide recognition for their research contributions.

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