

vibrations and rigid rotors; large amplitude nuclear motions occurring in floppy systems; the Born–Oppenheimer separation of the motions of heavy and light particles (nuclei and electrons, respectively) and its breakdown in some instances; and the Jahn–Teller effect and its relation to the Berry geometrical phase. The authors also give a brief and clear account of quantum chemical structure calculations (explaining the physics behind some of the mysterious acronyms circulating among quantum chemists), and even a glimpse of collision theory as applied to states with spatially diffuse electron clouds, the so-called Rydberg states. Fragmentation processes and continuous spectra in general are not discussed.

While the authors were obviously not in a position to discuss every subject in equal depth, they have complemented each chapter with carefully written bibliographical notes. These notes contain references to other textbooks, key historical papers, and related recent papers reflecting the present state of the art, and each reference is put into perspective by thoughtful comments. These bibliographical notes alone make the book a worthwhile acquisition for anyone active in spectroscopy.

Molecular symmetry is still given prominence in the present edition. The authors discuss the use of the molecular symmetry group introduced by Christopher Longuet-Higgins and Jon Hougen. The elements of the molecular symmetry group consist of permutations of identical particles, particularly nuclei. Most older textbooks had been based on the use of point groups consisting of the symmetry operations of molecules having specific structural symmetries like reflection planes and symmetry axes. As the authors point out, the molecular symmetry group is more fundamental, because it is based on the fact that identical particles are indistinguishable, and it does not require a molecule to possess a specific geometry at any given time. This approach turns out to be particularly fruitful, even vital, for the novel developments of modern spectroscopy, where studies are made of loose assemblies of atoms or molecules (weakly bound cluster molecules), which execute large amplitude vibrational motions with continuously changing structural geometry.

Bunker and Jensen have made a considerable pedagogical effort to make their reputedly difficult subject accessible to the reader. Each chapter contains problems inserted in the text, followed immediately by the solution. The formal developments are carried through in great detail, with many intermediate steps fully written out. This makes it easy for the newcomer

to see how things are done, although I felt that sometimes it was overdone, making it more difficult to follow the main thread of the argument.

The book is written in an easy, modern style that lets us see not only what is done but also why, for example, a particular route is followed instead of another and what difficulties are encountered along the way. Each chapter opens with an abstract and closes with a summary. The numerous cross-references are very helpful. The index includes, in addition to the usual material, important symbols as well as references to many individual molecules.

In conclusion I would say that this is an impressive book and an important contribution to a field that suffers from a lack of modern textbooks treating their subject in depth. Like Herzberg's volumes, this book will be most useful for everyday, practical purposes; it will also serve as an introductory text for the seriously interested newcomer to the field.

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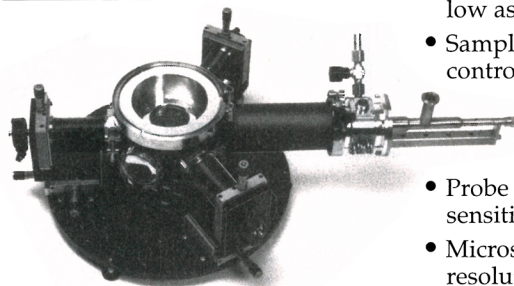
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