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BOOK REVIEW

Mihai V. Putz: Quantum nanochemistry

Apple Academic Press, Oakville, ON, 2016, 5 volumes, 3097 pp

Benjamin D. Smith[1]

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Chemists, physicists, and many others study matter. While the boundaries between these fields can be blurry, chemists and physicists are sometimes separated by the size of the matter that they examine. Chemists investigate matter at the atomic scale and above, while physicists look at the atomic scale and below. Professor Mihai Putz of the University of Timosoara, Romania, works at the atomic boundary in an attempt to better link physics and chemistry. As such, he has drawn on his peer-reviewed papers, lectures, conversations, and other sources to write a five-volume set entitled *Quantum Nanochemistry*. In these volumes, Professor Putz aims to illuminate the physical underpinnings of matter. While the properties and interactions of matter have been well-described by many classical theories, quantum theory is needed to describe matter below the atomic scale. In these volumes, Professor Putz hopes to unite materials scientists, physicists, chemists, and others as quantum scientists, who use analytical descriptions of matter to inform their work.

Over the five volumes, both quantum and classical approaches to understanding matter are explored. The first volume focuses on quantum physics, presenting an introduction to the basic theories and equations by describing the work of Bohr, Schrödinger, Einstein, and many others. The second volume opens with a history of chemistry and atomic theory. This volume then uses quantum theory to describe atoms, uniting the chemistry in the second book with the physics of the first. Quantum mechanical ideas of atomic periodicity, electronegativity, and more are developed. The third volume extends the ideas of the second in order to build quantized molecular models. This volume focuses heavily on the author's theory of bondons—a quantum bosonic particle associated with chemical bonding. The fourth and fifth volumes expand the scope to solid materials and structure–property relationships, respectively.

These books attempt to reach a broad audience and to cover a wide range of material. Concepts and ideas from engineering and materials science are mixed with those from chemistry and the history of science. While many of these concepts are given a lot of background information and explained well, a number of typographical and grammatical errors add confusion in some sections. Although these books reduce all concepts to mathematic and analytic descriptions whenever possible, so readers will be able to follow the main themes, especially for those with a strong background in physics and mathematics. The books heavily reflect the author's presentations and past work, yet the later volumes draw extensively from the literature. The books include many references for interested parties to explore. The books also include a number of informative tables and figures that could serve as helpful references; however, despite the emphasis on teaching and describing analytic work, there are no example problems given.

Overall, these five volumes cover a lot of material and work well to unite physicists and chemists as quantum scientists. The books are best used as a full set, as they weave common themes throughout. Due to the highly technical nature of the books, they would best be used by graduate students and other professional scientists in chemistry, physics, and any field that studies matter.

✉ Benjamin D. Smith
bdsmith@francis.edu

[1] Department of Chemistry, Science Center, Saint Francis University, Loretto, PA 15940, USA