

-Rolla and did some work in the field of eutectic crystallization.

## Physics of vision

**HUMAN COLOR PERCEPTION: A CRITICAL STUDY OF THE EXPERIMENTAL FOUNDATION.** By Joseph J. Sheppard Jr. 195 pp. American Elsevier, New York, 1968. \$10.00

by ISADORE NIMEROFF

In recent years information theory, developed to process and understand experimental data, has been extended to speculation about how the brain processes the stimulus information it receives. The subtitle of this short book by Joseph Sheppard indicates that the author critically reviews the experimental data of color perception but does not convey the idea that the critique will take on the information-theory approach.

This book, written by a comparative tyro in the field of color vision, is intended for scientists and engineers to whom knowledge about human visual processes is important for their research and work. The author is to be commended for having covered so many topics of the physics, physiology and psychology of color vision in a book of less than 200 pages. This brevity was accomplished by the author's generally clear and concise writing style that fails, however, to treat with sufficient depth the subject matters about which he complains. For instance, on pages 23, 39 and 47, he is critical of the use of average spectral tristimulus values and luminous-efficiency values to represent all observers or any one observer. Sheppard, however, has not reviewed the literature sufficiently deeply to have found the readily available work of David L. MacAdam, W. R. J. Brown, Gunter W. Wyszecki, and myself on the variability within and among observers.

Sheppard has criticized a wide variety of related topics, the collection of which is not to be found within the covers of any other book. Such a collection, if treated in depth, would have been extremely useful had it been written as late as 15 years ago. The terms, definitions and symbols Sheppard uses would have been consistent with those used then and could have had a strong influence on the direction of research. As it is, he leads the reader to wonder whether

some of his criticisms in a field one step removed from the reader's main interest are no longer justified.

I found the chapters on the psychology and physiology of color perception reasonably informative. These chapters should serve physicists as a ready source of reference to these topics. In Chapter III, Sheppard also shows that he has a penetrating understanding of the concept of metamers. The treatment of the other physical aspects of color vision in this book is not quite adequate however. It may be that psychologists and phys-

iologists will have the same opinion about the manner in which their respective specialities were presented.

Despite the shortcomings of this book, I recommend the acquisition of it by all who have an interest in color-vision investigation. No scientific field should be above a critical appraisal.

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## Quanta for nonphysicists

**QUANTUM MECHANICS: AN INTRODUCTION.** By Herbert L. Strauss. 192 pp. Prentice-Hall, Englewood Cliffs, N. J., 1968. Paper \$4.95, Cloth \$7.95

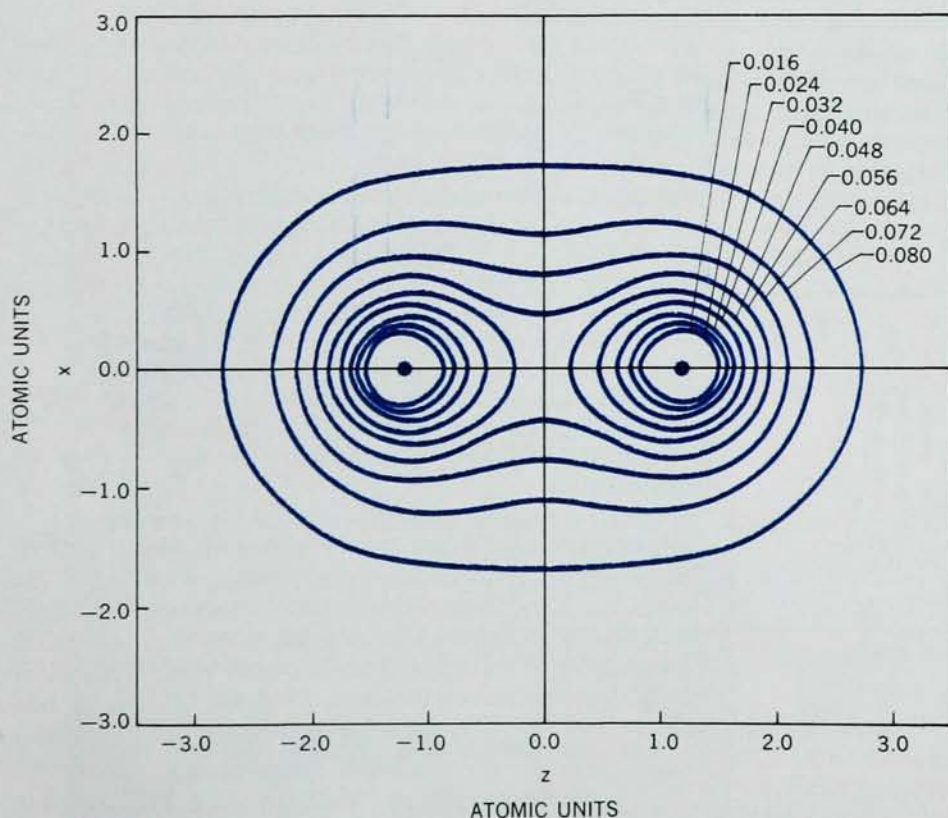
by PETER J. SILVERMAN

The usual introductory quantum-mechanics textbook, written with physics students in mind, presents quantum mechanics as the basis for understanding modern theoretical physics. This book is intended for students majoring in chemistry, molecular biology and related fields where quantum me-

chanics receives less emphasis than it does in physics.

Designed for seniors or first-year graduate students, the book requires a good working knowledge of vector calculus and a familiarity with thermodynamics and classical mechanics. However, the book is replete with mathematical tables and a fine appendix illustrating the basic facts of vector calculus, which should be both handy and helpful to anyone with an insufficient mathematics background.

The contents of the book are suffi-

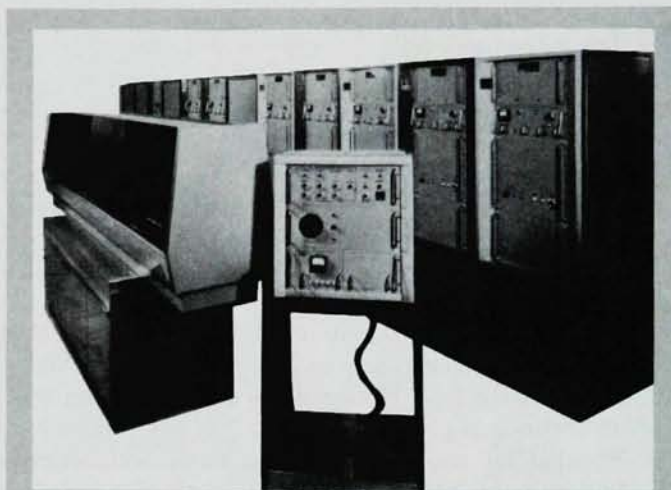


**CHARGE DISTRIBUTION** or wavefunction squared of the 1s gerade state of the hydrogen molecule ion. (After D. R. Bates, K. Ledsham, A. L. Stewart, *Phil. Trans. Roy. Soc. London* 246, 215 (1953), from *Quantum Mechanics: An Introduction*.)

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cient for a compact one-semester course. The author first presents a brief historical introduction and then gives a concise review of the rudiments of Hamiltonian mechanics. Next, the fundamentals of quantum mechanics are presented as a series of postulates that are illustrated in the subsequent chapters with one- and three-dimensional problems. The latter half of the book is principally devoted to approximation methods, including perturbation theory, the variational method and applications of these methods to specific problems. Many concepts, such as spin and symmetry, are developed in conjunction with applications to atomic and molecular systems. In addition to the usual square well, harmonic oscillator and hydrogen atom, the author has also devoted considerable space to a discussion of more complicated problems such as the hydrogen molecule and the hydrogen molecular ion. These are topics that are rarely included in a book at this level. Many of the examples are provided with tracings of computer-drawn curves that accurately display the results of the calculations.

Throughout the book, methods of using quantum mechanics to solve actual problems are stressed, rather than the theoretical development of the theory, thus emphasizing the utility of quantum mechanics as a calculational tool.

The writing is quite clear and concise, managing to convey a considerable amount of information with an economy of words. All mathematical developments are presented with more than the usual detail; nearly every step in each calculation is written out.

The most pleasing feature of this book is the excellent selection of problems, which are intended to both illustrate and supplement the textual material. The problems often illustrate realizable chemical situations in an interesting and challenging way. Many of them are original; they are well stated; some are provided with hints or answers, and a considerable number might prove useful in the usual advanced physics course presented to physics students.

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*Peter Silverman has been doing research in aeronomy at Goddard Space Flight Center for the last two years and is currently doing graduate research in superconductivity at the University of Maryland.*