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MORTON LOWENGRUB

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*Group theory and quantum mechanics*, by B. L. van der Waerden, Die Grundlehren der math. Wissenschaften, Band 214, Springer-Verlag, Berlin, 1974, vii+211 pp.

In 1932 B. L. van der Waerden published *Die gruppentheoretische Methode in der Quantenmechanik*. Forty-two years later he published a translated and revised edition, *Group theory and quantum mechanics*. In the preface of the translated edition van der Waerden explains the intent of the original book and the reasons for a revision:

Its aim was, to explain the fundamental notions of the Theory of Groups and their Representations, and the application of this theory to the Quantum Mechanics of Atoms and Molecules. The book was mainly written for the benefit of physicists who were supposed to be familiar with Quantum Mechanics. However, it turned out that it was also used by mathematicians who wanted to learn Quantum Mechanics from it. Naturally, the physical parts were too difficult for mathematicians, whereas the mathematical parts were sometimes too difficult for physicists. . . . In order to make the book more readable for physicists and mathematicians alike, I have rewritten the whole volume.

Before discussing whether van der Waerden has succeeded in his goal for the revised edition, let us briefly summarize the contents of the book. The book opens with Schrödinger's equation governing the state of a quantum mechanical system. Hilbert space is defined (as  $L^2$  spaces only) and we are told a little about operators on Hilbert space. Some, but not all, of the details of the solution of the one electron atom (and, in particular, the hydrogen atom) are given. We meet the azimuthal, main, and magnetic quantum numbers and the terms of the spectroscopic series. Perturbation theory is touched upon, as is angular momentum, the normal Zeeman effect, and selection rules. This is all part of the explanation of the basics of quantum mechanics.