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Book Review

Conceptual Foundations of Quantum Physics, Dipankar Home: Plenum Press, New York, 1997pp. XVII + 386.

Nowadays anyone interested in quantum electronics needs an appreciation of quantum mechanics. If he wants to be at the frontier of knowledge moreover, he needs to really understand it (in so far as this is possible!). The potential of quantum computing could after all be immense, and requires a thorough appreciation of the subject. The history of all this is rather strange.

As time passes different aspects of physics enter more deeply into the consciousness of scientists. But then they fade away again, before re-emerging possibly some generations later. About 1900 it was thermodynamics which was a key topic of interest to be replaced a little while later by "classical" relativity in the 1920s, etc. The quantum theory grew up in this period and was divided rather clearly in the applications and its uses generally on the one hand, and the foundational questions on the other. The latter were really left to the philosopher-scientists, although Einstein, Podolsky and Rosen, among others, raised such questions already in 1935. But most quantum physicists just got on with the job of applying the theory to atoms, molecules and to the solid state, and later to solid state devices. The really big applications usually turn out to be most surprising. This applies not only to $E = mc^2$ and the atomic explosions, but also to quantum theory and the resulting million transistors on a pinhead.

Today, interest in the foundational questions of quantum mechanics are at their peak. The publications are coming fast and have graduated from appearing in, say, *Nuovo Cimento*, to *Physical Review Letters*. There must be currently hundreds of papers, and several books per year in this area. This aspect of the subject is in a way harder than applying quantum mechanics: the conceptual questions which are raised are very difficult to disentangle. The book under review, by a distinguished scientist from the Bose Institute in Calcutta, deals with this topic in a careful way. There are, in fact, such full references that the book can be thought of as an introduction to the literature, particularly as there is no summary of main results or of interpretations or, which would also have been welcome, there is no summary of open questions. It must be understood, however, that these things are in any case very difficult to supply; this particular book is very readable and it is the type of book from which one can really learn (though the user is somewhat handicapped by an incomplete index).

Because of its great coverage, it is clear, however, that for anyone willing to spend some time on its study, this book will prove most rewarding.

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