

Book notice

D. Greenberger, K. Hentschel and F. Weinart (eds): Compendium of quantum physics. Berlin: Springer-Verlag, 2009, xvi+901pp, £153 HB

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Published online: 28 June 2011
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This is a wonderful book to dip into. Consisting of over 240 contributions from a stellar array of physicists and historians and philosophers of physics, it begins with the Aharonov–Bohm effect, runs through the Born Rule and the Copenhagen Interpretation, Entanglement, Hilbert Space, Matrix Mechanics, the Pauli Exclusion Principle, Quantum Logic, the Stern–Gerlach Experiment and Wave Function Collapse, before ending with Zero-point Energy. But over and above such ‘key concepts’, it contains such gems as Rohrlich on Berry’s Phase (surely a candidate for a Nobel Prize if ever there was one!), Greenberg (one of my personal heroes) on Generalizations of Quantum Statistics and Kiefer on Quantum Gravity. It also nicely mixes the physics and the philosophy and adds at least a flavour of the history. Kaiser on Feynman Diagrams nicely brings all those elements together, as does Lyre on Gauge Symmetry. More recent topics such as Quantum Communication, Computation and Interrogation (but not Information!) are also given their due, and Vaidman’s piece on the Two-State Vector Formalism is an excellent example of the value to be gained when you have someone who has contributed so much to a topic write a summary of it. Some of the vignettes are longer than others—I am surprised there’s so much on Rigged Hilbert Spaces and so little on the Spin-Statistics Theorem (where Berry’s proof isn’t mentioned), for example—but each offers a concise summary of the relevant concepts and issues, with a useful selection of primary and secondary literature.

I would say this is a book everyone interested in the history and philosophy of quantum physics should have on their desk or even at their bedside—if not for the price! Even then, it should be on hand electronically via your library’s online access.

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