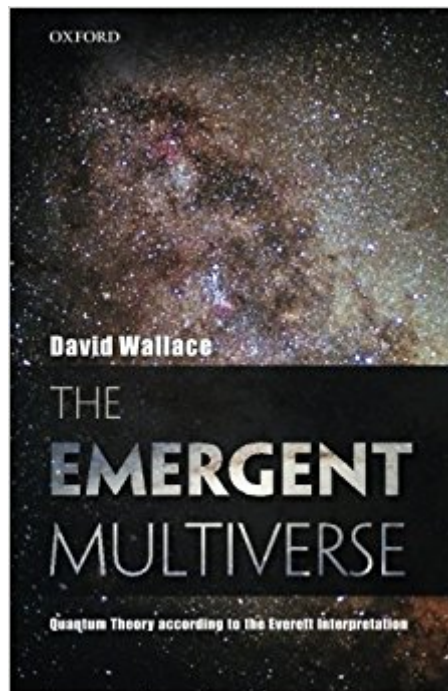




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The Emergent Multiverse: Quantum Theory According To The Everett Interpretation



Synopsis

The Emergent Multiverse presents a striking new account of the "many worlds" approach to quantum theory. The point of science, it is generally accepted, is to tell us how the world works and what it is like. But quantum theory seems to fail to do this: taken literally as a theory of the world, it seems to make crazy claims: particles are in two places at once; cats are alive and dead at the same time. So physicists and philosophers have often been led either to give up on the idea that quantum theory describes reality, or to modify or augment the theory. The Everett interpretation of quantum mechanics takes the apparent craziness seriously, and asks, "what would it be like if particles really were in two places at once, if cats really were alive and dead at the same time?" The answer, it turns out, is that if the world were like that--if it were as quantum theory claims--it would be a world that, at the macroscopic level, was constantly branching into copies--hence the more sensationalist name for the Everett interpretation, the "many worlds theory." But really, the interpretation is not sensationalist at all: it simply takes quantum theory seriously, literally, as a description of the world. Once dismissed as absurd, it is now accepted by many physicists as the best way to make coherent sense of quantum theory. David Wallace offers a clear and up-to-date survey of work on the Everett interpretation in physics and in philosophy of science, and at the same time provides a self-contained and thoroughly modern account of it--an account which is accessible to readers who have previously studied quantum theory at undergraduate level, and which will shape the future direction of research by leading experts in the field.

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Customer Reviews

"The Emergent Multiverse is the most extensive, careful, and wide-ranging discussion of Hugh Everett's so-called Many Worlds interpretation of quantum theory in existence (at least on our branch of the multiverse), and is certain to become the locus classicus for all future discussions of the theory.... You won't find a better discussion of both foundational issues and far-flung consequences of the theory anywhere."--Tim Maudlin, *Nous*"As those who have read Wallace's articles will expect, [this] is an excellent book, and should be required reading for anyone interested in the foundations of quantum mechanics."--Peter J. Lewis, *Notre Dame Philosophical Reviews*"This book is an outstanding achievement. It presents the current state of the art in the Everett interpretation to a depth and level of sophistication that will be appreciated by the leading experts in the foundations of quantum theory (of whom Wallace is one) -- and will educate them, and should chasten most of them."--David Deutsch, Centre for Quantum Computation, The Clarendon Laboratory, University of Oxford

David Wallace was born in San Rafael, California, in 1976, but has been resident in the UK since 1977. He studied theoretical physics at Oxford University from 1994-2002, but upon realising his research interests lay mostly in conceptual and foundational aspects of physics, he moved across into philosophy of physics. For the last six years he has been Tutorial Fellow in Philosophy of Science at Balliol College, Oxford. He holds PhDs in physics and in philosophy, and his research interests span a wide range of issues on the boundary between philosophy and physics: symmetry and the gauge principle, the direction of time, the structure of quantum field theory, and of course the interpretation of quantum mechanics.

I have been looking for a book that explains Everett's Many Worlds Interpretation of Quantum Mechanics in a way that is authoritative, thorough, rigorous, and understandable to a person like myself who is a scientist in a different field. This is it. Wallace uses a combination of mathematics, and verbal explanation of both physics and philosophy to make all the issues accessible. He writes very clearly and precisely, summarizes as he goes along and does not avoid (in fact, faces squarely) the common criticisms of MWI. This is by no means light reading, but rewards the careful reader with a much improved understanding of what MWI is and is not.

Parallel Universes, Quantum Theory and Quantum Computing all go hand in hand. The Emergent Multiverse clears up several topics which have been less than clear. For example the quantum basis of probability theory at a level where a "lay" technical person with a curiosity of how our

universe works can find useful and informative.

This is the definitive book for anyone interested in the Everett, or Many-Worlds, formulation of quantum theory. David Wallace is a leading philosopher of physics, with an incredibly deep understanding of the underlying physics. It isn't a popular-level book; this is a scholarly work, aimed at professional philosophers, physicists, and students. Wallace gives a thorough discussion of the main issues confronting the contemporary Everettian: decoherence, the emergence of classical worlds, pointer states, the origin of the Born Rule for probability, and time-asymmetry. The style is uniformly clear and engaging. Readers will certainly come to the work with a wide variety of opinions on the plausibility of Many-Worlds, but everyone should get a lot out of reading this book.

David Wallace has produced a classic. This will be *the* standard account of the Everett (or "many-worlds," if you will) interpretation for a long time to come. The breadth and depth of topics covered is staggering: the problem of ontology, the problem of preferred basis, the problem of probability, the problem of inference and confirmation, the problem of person identity, the problem of directionality of time, and many more, are all addressed in detail with clarity and elegance. To me, as a physicist with philosophical leanings, this book is scary and inspiring at the same time. It's scary because one gets the sense of the hardness of these questions, and the amount of knowledge from disparate fields (physics, philosophy, probability theory) and the amount of work necessary to make progress on these problems. It's inspiring because David Wallace has shown that it can be done. If whatever reason you're interested in the Everett interpretation, you must acquire this book. Even if you are vehemently opposed to the theory, you must take on Wallace's arguments. Note: Parts of the chapters on probability and inference can get really technical, but you can skip the technical parts and still get an excellent sense of his arguments. Does he solve the problem of probability? My opinion: yes, to a large extent. I feel that it has not been fully solved, but I agree with Wallace that it's unlikely we'll solve the problem until we get a better handle on similar problems in the foundations of probability.

This guy gets it. Wallace references Dr. David Deutsch and does an excellent job of showing why the Everett "interpretation" is the only understanding that makes no-B.S. sense - in other words, Everett is reality.

I liked this book a lot. It had parts which were very technical (it is quantum physics after all) but the

main thread of the argument is easy to follow and convincing. The idea argued for is the Everettian or Many worlds interpretation of Quantum Mechanics. To bolster his argument he applies the equations of the theory which can be quite technical but then he usually goes on to explain philosophically the justification of the interpretation. I suggest people who are not familiar with the mathematics of QM treat the equations like sentences from another language inserted into the text to make the author look smart and focus on the English translation which is the argument. The book is very comprehensible without the equations but it is a rigorous text and I think Wallace felt compelled to include them.

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