



Bananaworld: Quantum Mechanics for Primates

By Jeffrey Bub

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What if all you needed to know to understand quantum mechanics was how to peel a banana? This book offers a new approach to the mysteries of quantum theory that doesn't use a lot of math or confusing talk about cats being alive and dead. Instead it examines the underlying puzzle of quantum phenomena: the correlated behavior of separated systems. Focusing on these correlations, described in terms of quantum information, has become common in physics journals, but in this book the discussion is simplified. Instead of using abstract 'boxes' with correlations between inputs and outputs, this book uses an everyday object that you know well - a simple banana - and asks you to imagine what the world would be like if how a banana tasted depended on how you peeled it. Comparing this Bananaworld to our own world highlights exactly what is (and what isn't) bizarre about our quantum universe, and illustrates the novel thesis that quantum mechanics is really about the structure of quantum information. What we have discovered is that the possibilities for representing, manipulating, and communicating information are very different than we thought.

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Editorial Review

Review

"Jeffrey Bub is an outstanding philosopher of physics who has devoted his life to the understanding of quantum mechanics. His recent in depth exploration of the "quantum information" approach is deeply important. He also has a fine ability to explain the subtle and esoteric points clearly for the non-expert. The book will be an important contribution to the field and very helpful to those fascinated by the recent work in trying to understand quantum mechanics without getting immersed in the technical discussions." --*Lawrence Sklar, University of Michigan*

"Quantum theory is well known for being counter intuitive, and quantum correlations are especially difficult to grasp. But this is no reason to give up, or for the educated public to have no chance to understand this ongoing scientific revolution. Consequently, this book is most welcome. The author has chosen an amusing way to introduce the subject. This approach is possible because correlations are everywhere around us. Yet quantum correlations have peculiar features that the author introduces slowly. He also provides enough information for more curious readers who are not afraid of (simple) equations." --*Nicolas Gisin, University of Geneva*

"This is certainly a timely book as the topics of quantum information processing, quantum computation and quantum cryptography are flourishing. The premise of this book is that at the heart of this revolution, which could end up defining the 21st century, is a radically new information-theoretic interpretation of quantum mechanics. Although there are already many text books on the interpretation of quantum mechanics, the defining feature of this book which will make it stand out from the others is the use of simulation games to demonstrate the difference between classical and quantum information. I can foresee that these simulation games will be useful pedagogic tools, and could be adopted by university teachers as part of their lecture courses." --*Ifan Hughes, Durham University*

"Ultimately, a physicist's universe is mathematical: you can't get at it through intuition alone. ... It is a theme repeated in the extraordinary *Bananaworld*, in which Jeffrey Bub employs an innovative way of explaining the intricacies of quantum physics. ... *Bananaworld* should be mandatory reading for anyone studying or working in quantum or theoretical physics." --*New Scientist*

"Bub is a philosopher of physics, and the subject has never been more in need of input such as his: thoughtful, humble, informative. This is why, for me, *Bananaworld* should be mandatory reading for anyone studying or working in quantum or theoretical physics. --*Michael Brooks*

"Bananaworld is focused on theoretical issues rather than experiment, and will most likely appeal to those of

a mathematical and philosophical persuasion. The book deserves a place on academic library shelves wherever there is interest in the foundations of quantum physics. ... Recommended." --*CHOICE*

"There are no other books at this level, to my knowledge Bubs treatment of it is masterful. It is therefore my hope that this book finds the wide readership it deserves" -- *American Journal of Physics*

"*Bananaworld* represents an invaluable contribution to the quantum foundations literature that provides a serious, comprehensive and impressively accessible introduction to this flourishing field." -- *Metascience Review*

"This text will certainly become a classroom standard for training new generations of marine geochemists and inspire their amazing research to come." -- *Elements*

About the Author

Jeffrey Bub, *Distinguished University Professor, Philosophy Department, University of Maryland*

Jeffrey Bub received his PhD in mathematical physics from the University of London, UK, in 1966, where he studied physics with David Bohm at Birkbeck College and took part in Karl Popper's seminar in philosophy of science at the London School of Economics, UK. His first book, *The Interpretation of Quantum Mechanics* (Reidel, 1974), was influential in developing the concept of quantum logic. His second book, *Interpreting the "Quantum World"* (CUP, 1997; revised paperback edition, 1999), won the prestigious Lakatos Award in 1998. He is currently a Distinguished University Professor at the University of Maryland, College Park, USA.

Users Review

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Jacqueline Kang:

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