Where Does The Weirdness Go?: Why Quantum Mechanics Is Strange, But Not As Strange As You Think

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Few revolutions in science have been more far-reaching—but less understood—than the quantum revolution in physics. Everyday experience cannot prepare us for the sub-atomic world, where quantum effects become all-important. Here, particles can look like waves, and vice versa; electrons seem to lose their identity and instead take on a shifting, unpredictable appearance that depends on how they are being observed; and a single photon may sometimes behave as if it could be in two places at once. In the world of quantum mechanics, uncertainty and ambiguity become not just unavoidable, but essential ingredients of science—a development so disturbing that to Einstein ”it was as if God were playing dice with the universe.” And there is no one better able to explain the quantum revolution as it approaches the century mark than David Lindley. He brings the quantum revolution full circle, showing how the familiar and trustworthy reality of the world around us is actually a consequence of the ineffable uncertainty of the subatomic quantum world—the world we can't see.

Where Does The Weirdness Go?: Why Quantum Mechanics Is Strange, But Not As Strange As You Think Details

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From Reader Review Where Does The Weirdness Go?: Why Quantum Mechanics Is Strange, But Not As Strange As You Think for online ebook

Pvw says

I was expecting a broad and understandable introduction into quantum mechanics. The book only partly delivers. Throughout, it is an arduous plea for the Copenhagen interpretation of quantum mechanics. That roughly states that you shouln't be concerned with what nature is really like, and only accept the fact that the calculations fit. It says that nature is inexplicable and you just better live with it.

Now that may be right, so I'm partially convinced. What I didn't like about the book is that the experiments were poorly explained, with oversimplified drawings. As a reader, you don't get the chance to think along about the results of an experiment, because you have too few facts as to what the setup was really like.

As a final remark, I found it very 'weird' that Lindley expects us to accept that a certain event will only take place once a scientist makes a measurement (how on earth did things happen before there were humans to record results?). Next to that, he dismisses the ideas that events in small particles might be predictable in just one sentence, by saying: "If that would be true, than we wouldn't have free will. So it can't be predictable, it's random."

Believing that humans can affect events just by looking at them, and that information can travel faster than light is an easy leap of faith for Lindley, but the idea that free will might be just an illusion because we don't know any better is unacceptable?! That I don't get.

Jonathan Katz says

I remembering reading this book at times with my mom, but it originally made me interested in physics.

Mishehu says

Is my iPhone still there when I look away? Is a Mamwich both a sandwich and a meal? Was my 4th grade teacher simultaneously a swine and an angel? These aren't exactly the questions this book considers, but they're in keeping with the subject matter: quantum strangeness. Lest anyone say otherwise, the quantum world is a very strange world. And it's no less strange to me for having read this book. But I do have a far deeper understanding of what quantum physics is, why it's so powerful, and how it connects to the classical physical world. (Hint: it does so in bizarrely non-intuitive ways.) The book in review is a superb introduction to one of the most abstruse areas of scientific theorizing ever conceived. It does a first rate job of laying out the science of quantum physics (in layman's terms), and of working through the philosophical implications of the science. The jury's out on what quantum physics has to tell us about the world as it is. This fine book has done a better job than any I've read before of clarifying what we know, what we don't, and what we may (on objective grounds) never know for sure. I thoroughly enjoyed this entry in the popular science/philosophy of

science literature.

Rochelle says

It's hard to talk about how I feel about this book but I'll summarize:

1. I love the title, it's why I bought the book.

2. It is an interesting topic written by someone knowledgeable in the field

BUT
3. It has a horrible layout.

4. It is excessively repetitive and alternates between very complex ideas to ludicrously oversimplified "examples" with almost no lead ins. It's enough to give you whiplash.

5. It's very dry. I had to put the book down for a few weeks and come back to it.

AND 6. It does not TELL you what the book is about!
One of the first things you learn in writing is to make a thesis sentence to describe what you are about to talk about in a paper... This book did not tell you it was an explanation of the Copenhagen Theory until the very end of the book (some 200 pages in). It is absolute insanity that you have to read to end of the book before You find out the main premise of a science novel!

So even though I think this book has some wonderful information in it, I have to give it a two. The difficulties in the format are so outrageous I cannot overlook it.

Si Barron says

A very well written, pithy book on the Copenhagen interpretation of Quantum Mechanics.

This book is a good example of how to write an informative and witty primer without the extraneous guff that so many modern authors (or more likely their editors) feel the need to burden the reader with.

It is perhaps 250 pages long but it seems shorter (in a good way). It is a breeze to read (the writing is clear, concise, engaging and elegant); it presents everything that is applicable and relevant to the subject and it doesn’t engage in anything that is not germane.

[There is nothing calculated to annoy this reviewer more that waffle! Or stories! I hate those anecdotes.]

Ahem... Anyway this book tells you why quantum mechanics is weird in contrast with classic mechanics and then it goes into good depth about how the resolution of the two fudges the weirdness (Copenhagen) and then why this fudge isn’t a fudge (We can never know the underlying reality)

A truly interesting read and thoroughly engrossing in the way that a book such as (my last read) ‘The

Motivated Mind’ wasn’t.

Ben says

Clear, direct writing on severak of the more interesting puzzles surfaced by quantum mechanics over the last century. The topics will be familiar to readers of Brian Greene's popular explorations of the same ground, but Lindley's book has the advantage of a tighter focus on QM rather than physics generally.

The book explores the ambiguity of what "measurement" really means in a world driven at its core by quantum fuzziness. The Copenhagen interpretation declares by fiat that measurements occur without providing any specification of how, leaving room for other interpretations (many-worlds, hidden variables, ...) to fill the gap with greater and lesser degrees of success.

The final answer that Lindley provides is that the Copenhagen interpretation is probably the correct philosophy, and "decoherence" is the previously unspecified mechanism explaining why measurements always seem to yield "this" or "that" values, but not both simultaneously. However, the description of decoherence felt a bit muddled. On the one hand, he emphasizes that decoherence is the statistical byproduct of QM as applied to a vast number of interactions. It constructs the appearance of stable macroscopic properties only because any other possibility is vastly improbable. Yet, he at times seems to go further, claiming that decoherence creates a complete, qualitative break from quantum fuzziness.

This seems a counterproductive way to view the phenomenon. The quantum fuzziness always exists, even at the macro level; there is no absolute point at which deterministic, stable properties take over. Decoherence isn't some eraser that blots out the indeterminacy; it only explains how the fuzziness is apparently tamed at the scale of humans and measuring devices and such.

Apart from this confusion, the book is a wonderful, conscise read. Highly recommended for those interested in QM at the popular level.
