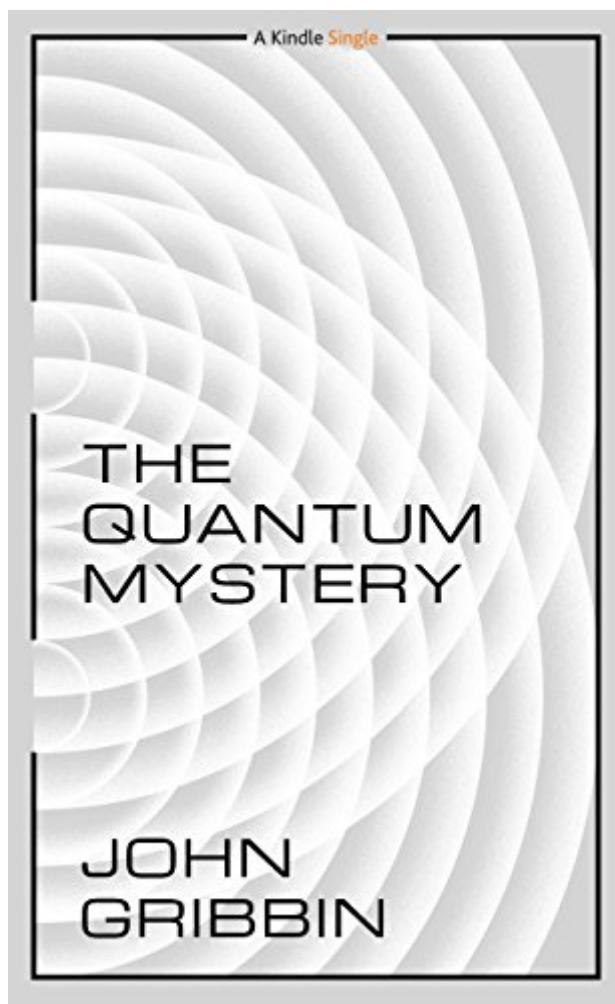


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The Quantum Mystery (Kindle Single)



Synopsis

What Richard Feynman described as "the central mystery" of quantum physics is encapsulated in the experiment with two holes, also known as the double-slit experiment. In this experiment, a particle going through one of a pair of holes seems to be aware of what is going on at the other hole, and changes its behaviour according to whether that hole is open or closed. This is closely linked to the puzzle of entanglement, where one particle instantly reacts to what is happening to another particle, even when they are widely separated. And in a final example of the mind-boggling nature of the quantum world, these effects seem to operate across time as well as space: What is going to happen in the future affects the behaviour of a particle now. In *The Quantum Mystery*, John Gribbin, the best-selling author of *In Search of Schrödinger's Cat*, describes the history of the double-slit experiment, the wave-particle duality of the quantum world, and the latest experiments which show these bizarre effects at work before our very eyes.

Book Information

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Customer Reviews

I'll say this for author John Gribbin - he's an excellent science writer with a way of explaining very complex ideas that interested readers can at least begin to wrap their minds around. In an earlier

book (Before the Big Bang), he did a splendid job of explaining what happened during the first split-second in the life of the universe. He's done the same thing with The Quantum Mystery, which explains the science behind the double-slit experiment (also known as the "experiment with two holes") of Englishman Thomas Young in 1801. Young had previously done experiments involving sound waves and had noted how these waves could interfere with one another. Believing that light traveled as waves, Young expected light waves would exhibit the same sort of interference effects. Young then adapted his sound experiment to study light, which has become known as the double-slit experiment. In the experiment, a light wave is split into two separate waves that later combine into a single wave. Changes in the path lengths of both waves result in a phase shift, creating interference patterns. Gribbin devotes a considerable portion of the book to providing the historical background of scientific discoveries both leading up to the double-slit experiment as well as subsequent developments like subatomic physics and the photoelectric effect. By the beginning of the twentieth century, the stage was set for the development of quantum physics. A key element in the development of quantum theory was discovering the electromagnetic wave-particle relationship (also known as wave-particle duality).

This is a very well written essay and should be a good read for all readers regardless of their degree of preparedness. The author starts with what Richard Feynman, Nobel prize winner, called a central mystery in quantum physics - the double slit experiment that "is impossible, absolutely impossible to explain." Then the author goes on to describe chronologically the important quantum mechanics developments and discoveries. In chapter six, while describing the Schrodinger's cat paradox the Author introduces the concept of the Many Worlds Interpretations (MWI). Here I was surprised by his statement: "This does not, as is often mistakenly suggested, imply that at the moment of truth the universe splits into two, one with a dead cat and one with a live cat. The idea is that there always were two universes, in one of which the cat died while in the other it lived. Here is no collapse and no splitting..." Other books I read were actually saying splitting. Wikipedia, on the other hand, says, there are numerous variations of the original Everett's proposal of WMI. Everett, who first introduced the idea of MWI, talked about universe branching, and, clearly, this is not the same as splitting. In any case, this is not an important point. In the last chapter the author describes "the most beautiful experiment in Physics" first visualized, by Richard Feynmann in 1965 who doubted it would be ever practical to carry out. It was carried out for the first time in 1974 by an Italian team. This is the double slit experiment (DSE) with firing particles one at a time. The essay ends rather abruptly without discussing the expected but classically unexplainable result of the

DSE.

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