



Entanglement: The Greatest Mystery in Physics

By Amir D. Aczel



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Since cyberspace became reality, the lines between "science" and "science fiction" have become increasingly blurred. Now, quantum mechanics promises that some of humanity's wildest dreams may be realized. Serious scientists, working from Einstein's theories, have been investigating the phenomenon known as "entanglement," one of the strangest aspects of our strange universe. According to Einstein, quantum mechanics required entanglement — the idea that subatomic particles could become linked, and that a change to one such particle would instantly be reflected in its counterpart, even if separated by a universe. Einstein felt that if quantum theory could produce such bizarre effects, then it had to be invalid. But new experiments show that not only does it happen, but that it may lead to unbreakable codes, and even teleportation, perhaps in our lifetime.



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Editorial Review

From Publishers Weekly

In his newest book, Aczel (*Fermat's Last Theorem*) discusses a great mystery in physics: the concept of entanglement in quantum physics. He begins by explaining that "entanglement" occurs when two subatomic particles are somehow connected or "entangled" with one another, so that when something happens to one particle, the same thing simultaneously happens to the other particle, even if it's miles away. However, this concept violates the theory of special relativity, since communication between two places cannot occur faster than the speed of light. Einstein knew that the mathematics of quantum theory predicted that this could happen, but he didn't believe it. In the last decade, researchers have shown in laboratory experiments that entanglement does indeed happen, and in one case it occurred over a distance of almost 10 miles. Aczel explores how a Star Trek-like teleportation may be possible via entanglement (however, a particle's quantum state, not the entire particle, is teleported to its mate), though perhaps at the expense of demonstrating entanglement's more real-world applications to cryptography. General readers may need to skim over his technical explanations, whereas more advanced readers will be interested in only the last third of the book. While the book won't satisfy dedicated science buffs, it will be an accessible entry into this concept of quantum physics.

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From Library Journal

"Entanglement" is one of the more remarkable aspects of quantum mechanics, a field that has produced a number of counterintuitive phenomena. Entangled particles are created in the same process and retain a connection even if they become far separated physically. If a change is later imposed on one of these particles, then there instantaneously occurs a change with its entangled partner, even if that partner is very far away in another part of the universe. Thus, the news of the change is transmitted with infinite velocity by an unknown means. Einstein aptly referred to this phenomenon as "spooky." In recent decades, researchers have shown entanglement to be a physical fact, thereby vindicating quantum mechanics, spooky though it may be. Aczel (*Fermat's Last Theorem*) tells most of this story at a pace that is slow enough and understandable for lay readers, but the last few chapters are more technical. Some sections read awkwardly and would have benefited from better editing, but on the whole this is recommended for college and large public libraries.

Jack W. Weigel, Ann Arbor, MI

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Review

"I am altogether happy that there is now a book on entanglement, almost 70 years after its discovery, and recommend it to people interested in the historical background and practical implications of quantum mechanics!" (Nature, 21 November 2002) "a book that's perhaps the best lay description of the evolution and current state of quantum physics available today!" (Focus, February 2003) "Amir D. Aczel's short biographies of these quantum pioneers are lively and entertaining..." (The Times Literary Supplement, 11 September 2003)

Users Review

From reader reviews:

Nathan Jackson:

Book is to be different for every grade. Book for children until eventually adult are different content. We all know that that book is very important for us. The book Entanglement: The Greatest Mystery in Physics seemed to be making you to know about other expertise and of course you can take more information. It is extremely advantages for you. The publication Entanglement: The Greatest Mystery in Physics is not only giving you a lot more new information but also to get your friend when you really feel bored. You can spend your own spend time to read your e-book. Try to make relationship with the book Entanglement: The Greatest Mystery in Physics. You never feel lose out for everything if you read some books.

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