



Quantum: Einstein, Bohr, and the Great Debate about the Nature of Reality

By Manjit Kumar

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“A lucid account of quantum theory (and why you should care) combined with a gripping narrative.”—*San Francisco Chronicle*

Quantum theory is weird. As Niels Bohr said, if you weren't shocked by quantum theory, you didn't really understand it. For most people, quantum theory is synonymous with mysterious, impenetrable science. And in fact for many years it was equally baffling for scientists themselves. In this tour de force of science history, Manjit Kumar gives a dramatic and superbly written account of this fundamental scientific revolution, focusing on the central conflict between Einstein and Bohr over the nature of reality and the soul of science. This revelatory book takes a close look at the golden age of physics, the brilliant young minds at its core—and how an idea ignited the greatest intellectual debate of the twentieth century. 16 pages of photographs

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Editorial Review

From Publishers Weekly

Starred Review. With vigor and elegance, Kumar describes the clash of titans that took place in the world of physics in the early 20th century, between physicists who did and those who did not believe in the quantum—the strange concept that we now know to be the underpinning of reality. The titans in Kumar's account of the conflict are Albert Einstein and Niels Bohr. In 1900, Max Planck discovered that electromagnetic radiation and the energy of light are transmitted not in a continuous flow but in small packets called quanta (singular, quantum). Bohr applied the idea of quantum to electrons, leading to the development of quantum mechanics. Bohr's theory explained experimental results that were inexplicable in classical theory. Einstein rejected Bohr's theory overturning reality in dangerous but also thrilling ways. The clash culminated at the 1927 Solway conference. Kumar, founding editor of *Prometheus* and a consulting science editor for *Wired UK*, recounts this meaty, dense, exciting story, filled with vivid characters and sharp insights. With physics undergoing another revolution today, Kumar reminds us of a time when science turned the universe upside down. 16 pages of photos. (May)

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From [Booklist](#)

Starred Review “A first rate mind, extremely critical and far-seeing.” Einstein quickly sizes up the mental powers of Danish scientist Neils Bohr. How ironic that Bohr will demonstrate his farseeing vision most compellingly by discrediting Einstein's own myopia! Kumar recounts Bohr's astounding triumph over the great German theorist in their debate over quantum physics, thus illuminating a pivotal episode in modern physics. In that episode readers see how quantum mechanics integrates a range of promising but puzzling and seemingly disconnected subatomic discoveries. Readers see, for instance, how a cautious Max Planck reluctantly parcels light into discrete packets and how a befuddled Ernest Rutherford recognizes that only a radically new model of the atom can explain alpha-particle deflections. Though only specialists will understand the technical issues, Kumar keeps the main thread of his narrative accessible to the intelligent general reader, particularly clarifying how Einstein's belief in objective reality pits him against the daringly agnostic Bohr, who leaves the mysteries of wave-particle duality veiled in statistical probabilities and abstract formulas. Intellectual exhilaration runs high as Einstein repeatedly presses Bohr—posing daunting questions about how to weigh an imaginary box of light and how to explain eerily “entangled” particles. The future of science hangs in the balance: physics becomes high drama. --Bryce Christensen

Review

“Exhilarating. . . . Reading [*Quantum*] is a bit like lifting the hood of your mind and moving the working parts around; it's challenging and trippy—as only the Dr. Seuss realm of the quantum can be.” (Laura Miller - Salon)

“As a fairly innumerate non-scientist, I am perversely drawn to books about maths and science and usually abandon them with ignorance intact. However, *Quantum* by Manjit Kumar . . . is so well written that I now feel I've more or less got particle physics sussed. *Quantum* transcends genre—it is historical, scientific, biographical, philosophical.” (The Guardian)

“Kumar is an accomplished writer who knows how to separate the excitement of the chase from the sometimes impenetrable mathematics.” (Financial Times)

"[Kumar] leavens the mind-bending with sketches of the remarkable human beings involved in this godlike enterprise." (Sara Lippincott - Los Angeles Times)

"A necessary, mesmerizing and meticulous volume." (Sam Coale - Providence Journal)

"Kumar brings lucidity and a sense of drama to what is usually considered by lay readers as an esoteric, bubble-chambered subject. He does this without sacrificing the 'science of it' at the altar of readability. The triumphs and the tribulations, the politics and the physics, the humanity and the genius of the protagonists all collide to produce the sort of energy that we usually expect in a Le Carre thriller." (The Hindustan Times)

"A super-collider of a book, shaking together an exotic cocktail of free-thinking physicists, tracing their chaotic interactions and seeing what God-particles and black holes fly up out of the maelstrom... Provides probably the most lucid and detailed intellectual history ever written of a body of theory that makes other scientific revolutions look limp-wristed by comparison." (The Independent [UK])

"Lively....Chock-full of colorful characters." (Graham Farmelo - The New York Times Book Review)

"One of the best guides yet to the central conundrums of modern physics." (John Banville, author of The Sea)

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