



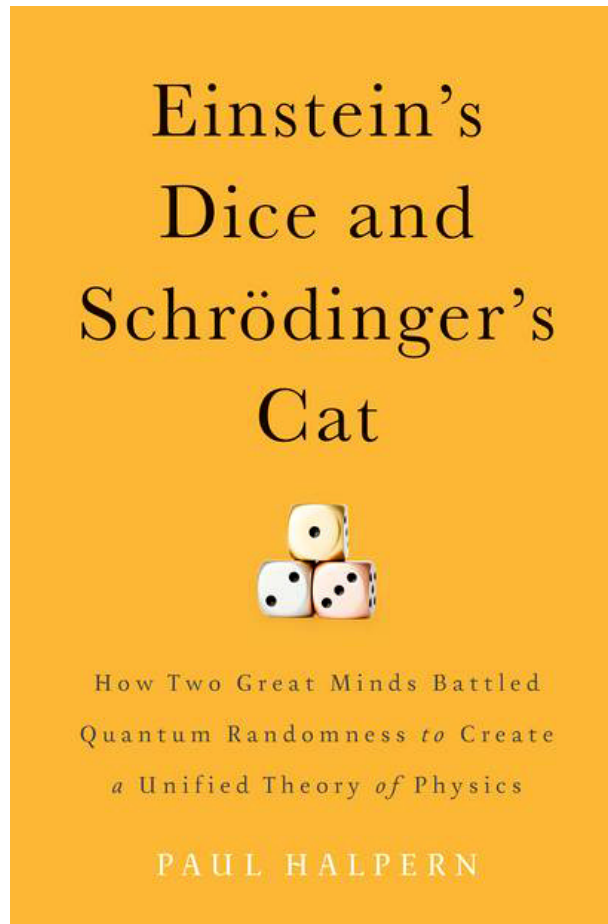
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# PARK CITY DAILY NEWS

## 'Einstein's Dice' a great read

Posted: Sunday, June 14, 2015 1:00 am

*"Einstein's Dice and Schrödinger's Cat: How Two Great Minds Battled Quantum Randomness to Create a Unified Theory of Physics," by Paul Halpern. New York: Basic Books, 2015. 288 pages, \$27.99.*



"This is the tale of two brilliant physicists (Albert Einstein and Erwin Schrödinger), the 1947 media war that tore apart their decades-long friendship, and the fragile nature of scientific collaboration and discovery," Paul Halpern explains near the beginning of *"Einstein's Dice and Schrödinger's Cat: How Two Great Minds Battled Quantum Randomness to Create a Unified Theory of Physics."*

"When they were pitted against each other, each scientist was a Nobel laureate, well into middle age, and certainly past the peak of his major work," the author continues. "Yet the international press largely had a different story to tell. It was a familiar narrative of a seasoned fighter still going strong versus an upstart contender hungry to seize the trophy."

While I was aware of "Schrödinger's cat" – I first encountered the paradox in my sophomore philosophy sequence at the University of Tennessee at Martin in the late 1970s – I didn't know much about the man himself until I ran across this little gem during one of my excursions to our local Barnes & Noble

Booksellers. As Halpern makes exquisitely clear, the scenario Schrödinger devised closely parallels his life in a variety of ways.

"The ambiguity of Schrödinger's cat perfectly matched the contradictory life of its creator," Halpern observes. "The bookish, bespectacled professor maintained a quantum superposition of contrasting views. His yin-yang existence began in his youth when he learned German and English from different family members and was raised bilingual. With ties to many countries but a supreme love of his native Austria, he never felt comfortable with either nationalism or internationalism and preferred avoiding politics altogether."

Even though Einstein died in 1955 and Schrödinger passed away in 1961, their influence on how we understand the world remains at the forefront of scientific and philosophical thought. This

wonderfully concise yet deceptively complex volume consists of eight chapters sandwiched between an introduction and conclusion. The 14 pages of source notes included after the main narrative speak to authority Halpern exhibits as he winds his way through the scientific arguments, political implications and personal relationships at the heart of the struggle for credibility and validation this story ultimately represents.

“Inspired in part by dialogue with Einstein, the conundrum of Schrödinger’s cat presses the implications of quantum physics to their very limits by asking us to imagine the fate of a cat becoming entangled with the state of a particle,” Halpern writes. “The cat is placed in a box that contains a radioactive substance, a Geiger counter and a sealed vial of poison. The box is closed, and a timer is set to precisely the interval at which the substance would have a 50-50 chance of decaying by releasing a particle. The researcher has rigged the apparatus so that if the Geiger counter registers the click of a single decay particle, the vial would be smashed, the poison released, and the cat dispatched. However, if no decay occurs, the cat would be spared.”

“According to quantum measurement theory, as Schrödinger pointed out, the state of the cat (dead or alive) would be entangled with the state of the Geiger counter’s reading (decay or no decay) until the box is opened,” he continues. “Therefore, the cat would be in a zombielike quantum superposition of deceased and living until the timer went off, the researchers opened the box, and the quantum state of the cat and counter ‘collapsed’ (distilled itself) into one of the two possibilities.”

As many scientists and philosophers have surmised over the decades since Schrödinger first proposed this thought experiment in his 1935 paper, “The Present Situation in Quantum Mechanics,” the phenomena explained/predicted by quantum mechanics are sometimes difficult to get your head around. I began my undergraduate career as a physics major because I was intrigued by the work of Einstein and Werner Heisenberg; I was fascinated by the connection between physics, philosophy and religion (and there is certainly a connection there). I later switched to biology because I preferred what at the time seemed more tangible, although I have to admit that Halpern’s description of the often-intense rivalry between Einstein and Schrödinger has renewed my interest in the topic at hand.

“These two old friends, comrades in the battle against the orthodox interpretation of quantum mechanics, had never anticipated that they would be battling in the international press,” Halpern notes. “That was certainly neither Schrödinger nor Einstein’s intention when they had begun their correspondence about unified field theory some years earlier.”

Halpern is a physics professor at the University of the Sciences in Philadelphia. His resume includes a Guggenheim Fellowship, a Fulbright Scholarship and an Athenaeum Literary Award. A regular contributor to NOVA’s “The Nature of Reality” physics blog, he has published extensively in both scholarly journals and the popular press and has appeared on a variety of radio and television shows including “Future Quest” and “The Simpsons 20th Anniversary Special.” His previous 14 books include “The Great Beyond: Higher Dimensions, Parallel Universes, and the Extraordinary Search for a Theory of Everything,” “Edge of the Universe: A Voyage to the Cosmic Horizon and Beyond,” “Collider: The Search for the World’s Smallest Particles” and “Countdown to Apocalypse: A Scientific Exploration of the End of the World.”

More than a tale about scientific rivalry, “Einstein’s Dice and Schrödinger’s Cat” is a case study in how intellectual pursuits are often intertwined with fame and an intense need for validation and recognition. It’s a great read. I recommend it highly.

— *Reviewed by Aaron W. Hughey, Department of Counseling and Student Affairs, Western Kentucky University.*