

rhetorical question

Successful, yes, but mysterious, too. Balancing the glory of quantum achievements, we have the shame of not knowing "how come." Why does the quantum exist?

some things remains a mystery Science can't tell us why anything exists. We still need religion for that.

Names

My mentor, the Danish physicist, Niels Bohr, made his peace with the quantum. His "Copenhagen Interpretation" promulgated in 1927 bridged the gap between the strangeness of the quantum world and the ordinariness of the world around us. It is the act of measurement, said Bohr, that transforms the indefiniteness of quantum events into the definiteness of everyday experience.

Bohr suggested it's measurement that makes the quantum useful

Its mysterious quality is a separate issue.

Key words

one interpretation

Further explanation

And what one can measure, he said, is necessarily limited. According to his principle of complementarity, you can look at something in one way or in another way, but not in both ways at once. It may be, as one French physicist put it, "the fog from the north," but the Copenhagen interpretation remains the best interpretation of the quantum that we have.

This is best theory we have.

Detailed margin notes

margin cue words

anecdote

Albert Einstein, for one, could never accept this world view. In on-again, off-again debates over more than a dozen years, Bohr and Einstein argued the issues—always in a spirit of great mutual admiration and respect. I made my own effort to convince Einstein, but without success. Once, around 1942, I went around to his house in Princeton to tell him of a new way of looking at the quantum world developed by my student, Richard Feynman.

Einstein didn't accept this

I'm with Einstein on this.

name-dropper!

second interpretation

Feynman pictured an electron getting from point A to point B not by one or another possible path, but by taking all possible paths at once. Einstein, after listening patiently, said, as he had on other occasions, "I still cannot believe God plays dice." Then he added, "But maybe I have earned the right to make my mistakes."

Feynman proposed another explanation.

Einstein recognizing the limits of science?