ALSO BY AMIT GOSWAMI

The Concepts of Physics
Quantum Mechanics

With Maggie Goswami

The Cosmic Dancers

THE SELF-AWARE UNIVERSE

HOW CONSCIOUSNESS CREATES THE MATERIAL WORLD

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within the framework of monistic idealism. The result is an idealist science that integrates spirit and matter.

The idea that consciousness collapses the quantum wave was originally proposed by the mathematician John von Neumann in the 1930s. What took us so long to take this idea seriously? Perhaps a brief discussion of how my own clarity on this issue developed will help.

One of the difficulties I had with von Neumann's proposal had to do with experimental data. When we look, we seem to be always conscious. Then the question of consciousness collapsing the quantum waves seems purely academic. Could one ever find a situation where one is looking, but is not conscious? Notice how paradoxical this sounds.

In 1983, I was invited to a ten-week-long seminar on consciousness at the psychology department at the University of Oregon. I was particularly flattered that these erudite psychologists patiently listened to six full hours of talks that I gave on the quantum ideas. The real reward came, however, when one of the graduate students of psychologist Michael Posner's group reported some cognitive data collected by a fellow named Tony Marcel. Some of the data concerned "unconscious seeing": exactly what I was looking for.

With heart palpitating, I listened to the data and relaxed only when I realized that the data are completely in agreement with consciousness collapsing the quantum state of the brain-mind when we see consciously (see chapter 7). In unconscious seeing, there is no collapse, and that really made a lot of experimental difference. Soon I realized also how to resolve the slight paradox that the distinction of conscious and unconscious perception creates. The trick is to distinguish between consciousness and awareness.

Chapter 5

OBJECTS IN TWO PLACES AT ONCE AND EFFECTS THAT PRECEDE THEIR CAUSES

THE FUNDAMENTAL TENETS of material realism simply do not hold up. In place of causal determinism, locality, strong objectivity, and epiphenomenalism, quantum mechanics offers probability and uncertainty, wave-particle complementarity, nonlocality, and mixing of subjects and objects.

About the probability interpretation of quantum mechanics, which breeds uncertainty and complementarity, Einstein used to say that God does not play dice. To see what he meant imagine that you are doing an experiment with a radioactive sample that, of course, obeys probabilistic quantum laws of decay. Your job is to measure the time it takes for ten radioactive events—ten clicks of your Geiger counter. Suppose further that it takes on the average half an hour for the ten cases of radioactive decay to occur. Behind that average lurks probability. Some runs could take thirty-two minutes, other runs twenty-five minutes, and so on. To complicate things, you have a bus to catch to meet your fiance, who absolutely hates to be kept waiting. And guess what? Your last run takes forty minutes because a single atom, at random, will not decay like the average ones did. So you miss your bus, your fiance breaks up with you, and your life is ruined.[1] This may be a somewhat silly,