



Mystics and Scientists in the Twenty-First Century: Science and Spirituality Revisited

Fritjof Capra

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Introduction

I am sorry I can't be with you at this unique anniversary conference, but I'm really happy to be able to share some thoughts with you in this way. What I'd like to share with you is my view of the relationship between science and spirituality, and how it has evolved over the last 50 years or so.

I was trained as a physicist and spent twenty years, from 1965-85, doing research in theoretical high energy physics. From my early student years, I was fascinated by the dramatic changes of concepts and ideas that occurred in physics during the first three decades of the twentieth century. At the age of nineteen, I read about this revolutionary period in science for the first time in a book by Werner Heisenberg, one of the founders of quantum theory. The book, which has since become a classic, is called *Physics and Philosophy*. In it Heisenberg gives a vivid account of the experience of a small group of physicists — Niels Bohr, Erwin Schrödinger, Wolfgang Pauli, and others — who were the first to explore physical phenomena involving atoms and subatomic particles, which brought them in contact with a strange and unexpected world. In their struggle to grasp this new reality, those scientists became painfully aware that their basic concepts, their language, and their whole way of thinking were inadequate to describe atomic phenomena. Their problems were not merely intellectual, but amounted to an intense emotional and, one could say, even existential crisis. It took them a long time to overcome this crisis, and in the end they were rewarded with deep insights into the nature of matter and its relation to the human mind.

When I read Heisenberg's book as a young student in Vienna, I understood probably less than half of it, but the book became my companion throughout my career as a physicist and had a profound impact on my thinking. It prepared the ground for my understanding of the

profound change of worldviews, or paradigms, that is now happening in all the sciences and throughout society — a change from the mechanistic worldview of Descartes and Newton to a holistic and ecological view.

I received my Ph.D. in theoretical physics from the University of Vienna in 1966, spent two years at the University of Paris, and then moved to the University of California. During the next two years, I experienced the so-called counterculture in California as a profound and radical personal transformation, which included a deep interest in Eastern spiritual traditions, the practice of meditation, and a strong sense of empowerment.

The Dance of Shiva

During that time, I had a unique experience that set me on the road that led to the writing of my first and still best known book, *The Tao of Physics*. I was sitting by the ocean one late summer afternoon, watching the waves rolling in and feeling the rhythm of my breathing, when I suddenly became aware of my whole environment as being engaged in a gigantic cosmic dance. Being a physicist, I knew that the sand, rocks, water, and air around me were made of vibrating molecules and atoms, and that these consisted of particles which interacted with one another by creating and destroying other particles. I knew also that the Earth's atmosphere was continually bombarded by showers of so-called "cosmic rays" — particles of high energy undergoing multiple collisions as they penetrate the air.



All this was familiar to me from my research in high-energy physics, but until that moment I had only experienced it through graphs, diagrams, and mathematical theories. As I sat on that beach in meditation, my former experiences came to life. I “saw” cascades of energy coming down from outer space, in which particles were created and destroyed in rhythmic pulses. I “saw” the atoms of the elements and those of my body participating in this cosmic dance of energy. I felt its rhythm and I “heard” its sound; and that moment I *knew* that this was the Dance of Shiva, the Lord of Dancers worshipped in Hinduism.

At that time, I had already become very interested in Eastern mysticism and had begun to see some striking parallels to modern physics. I had been particularly attracted to the puzzling aspects of Zen Buddhism which reminded me of the puzzles in quantum theory, described so vividly in Heisenberg’s book. At first, however, relating physics and mysticism was a purely intellectual exercise. It took me several years to overcome the gap between rational, analytical thinking and meditative consciousness; to experience how the mind can flow freely; how spiritual insights come on their own, without any effort, emerging from the depth of consciousness.

The unforgettable experience of the Dance of Shiva was followed by many similar, though less powerful, experiences; and gradually I came to realise that modern physics leads us to a consistent view of the world that is harmonious with ancient Eastern wisdom. I took many notes over the years, wrote a few articles about the parallels I kept discovering, and finally I summarised my discoveries in *The Tao of Physics*, published first in London and Berkeley in 1975 and now available in over 40 editions and over 20 languages around the world.

Science and religion

At first glance, it seems strange that one could draw parallels between science and mysticism, because scientists and spiritual teachers pursue very different goals. While the purpose of the former is to find explanations of natural phenomena, that of the latter is to change a person’s self and way of life. However, in their different pursuits, both are led to make statements about the nature of reality that can be compared.

Before I go into more detail, I need to say a few words about religion. The view of science and religion as a dichotomy has a long history, especially in the Christian tradition, and has recently been revived in several books written by scientists like Stephen Jay Gould, Richard Dawkins, and others. On the other hand, there are many scientists who see no intrinsic dichotomy between science and religion, or science and spirituality. At the very core of this confusing situation, in my opinion, lies the failure of many authors to distinguish clearly between spirituality and religion.

To understand the nature of spirituality, it is useful to begin with the root meaning of the word “spirit.” The Latin *spiritus* means “breath”; and interestingly this is also true for the related Latin word *anima*, the Greek *psyche*, and the Sanskrit *atman*. The common meaning of these key terms indicates that the original meaning of spirit, and of soul, in many ancient philosophical and religious traditions, in the West as well as in the East, is that of the breath of life. Spirit — the breath of life — is what we have in common with all living beings. It nourishes us and keeps us alive.

Spirituality is usually understood as a way of being that flows from a certain profound experience of reality, which is known as “mystical,” “religious,” or “spiritual” experience. There are numerous descriptions of this experience in the literature of the world’s religions, which tend to agree that it is a direct, non-intellectual experience of reality with some fundamental characteristics that are independent of cultural and historical contexts.

In accordance with the original meaning of spirit as the breath of life, spiritual experience can be described as a non-ordinary experience of reality during moments of heightened aliveness. Our spiritual moments are moments when we feel intensely alive. The aliveness felt during such a “peak experience,” as psychologist Abraham Maslow called it, involves not only the body but also the mind. Buddhists refer to this heightened mental alertness as “mindfulness,” and they emphasise that mindfulness is deeply rooted in the body. Spiritual experience is an experience of aliveness of mind and body as a unity.

Moreover, this experience of unity transcends not only the separation of mind and body, but also the separation of self and world. The central awareness in these spiritual moments is a profound sense of oneness with all, a sense of belonging to the universe as a whole. This sense of oneness with the natural world is fully borne out by modern physics, and in fact by modern science as a whole.

However, this is not necessarily true for religion, and here it becomes important to distinguish between the two. Spirituality is a way of being grounded in a certain experience of reality that is independent of cultural and historical contexts. Religion is the organised attempt to understand spiritual experience, to interpret it within a particular historical and cultural context, and to use this interpretation as the source of moral guidelines for the religious community.

In many spiritual traditions — for example, in the various schools of Buddhism — the mystical experience is always primary; its descriptions and interpretations are considered secondary and tentative, insufficient to fully describe the spiritual experience. In a way, these descriptions are not unlike the limited and approximate models in science, which are always subject to further modifications and improvements.

In the history of Christianity, by contrast, theological statements about the nature of the world, or about human nature, were often considered as literal truths, and any attempt to question or modify them was deemed heretical. This rigid position of the Church led to the well-known conflicts between science and fundamentalist Christianity, which have continued to the present day.

In fact, fundamentalist attitudes are not limited to religious leaders. Scientists, too, can be fundamentalists, forgetting that all their models and theories are limited and approximate, and ignoring the important role of metaphors — in religion as well as in science. When that happens, the debate between scientists and religious leaders soon turns into a *dialogue des sourds*, as the French call it, a “dialogue of the deaf.”

My main thesis

Now let me summarise the main thesis of *The Tao of Physics*. My main thesis is that the approaches of physicists and mystics, even though they seem at first quite different, share some important characteristics. To begin with, their method is thoroughly empirical. Physicists derive their knowledge from experiments; mystics from meditative insights. Both are observations, and in both fields these observations are acknowledged as the only source of knowledge.

The objects of observation are of course very different in the two cases. Mystics look within and explore their consciousness at various levels, including the physical phenomena associated with the mind’s embodiment. Physicists, by contrast, begin their inquiry into the essential nature of things by studying the material world. Exploring ever deeper realms of matter, they become aware of the essential unity of all natural phenomena. More than that, they also realise that they themselves and their consciousness are an integral part of this unity. Thus the mystic and the physicist arrive at the same conclusion; one starting from the inner realm, the other from the outer world. The harmony

between their views confirms the ancient Indian wisdom that *brahman*, the ultimate reality without, is identical to *atman*, the reality within.

A further important similarity between the ways of the physicist and the mystic is the fact that their observations take place in realms that are inaccessible to the ordinary senses. In modern physics, these are the realms of the atomic and subatomic world; in mysticism, they are non-ordinary states of consciousness in which the everyday sensory world is transcended. In both cases, access to these non-ordinary levels of experience is possible only after long years of training within a rigorous discipline, and in both fields the “experts” assert that their observations often defy expressions in ordinary language.

Impact of the book

Over the last forty years, *The Tao of Physics* has been received with an enthusiasm that went beyond my wildest expectations. This tremendous response has had a strong impact on my work and my life. I have traveled extensively, lecturing to professional and lay audiences in Europe, North and South America, and Asia; and discussing the implications of the so-called “new physics” with men and women from all walks of life. Since then, I have written several more books, but still today I encounter people all over the world who tell me: “I love your book” or “Your book has changed my life.” And I don’t need to ask which book they mean. They mean *The Tao of Physics*.

Again and again, I have witnessed how this book and my lectures about it generate a strong resonance in people, and I have come to understand this enthusiastic reception in terms of the broader cultural context of my work. Again and again, men and women would write to me, or would tell me after a lecture: “You have expressed something I have felt for a long time without being able to put it into words.” These were generally not scientists, nor were they mystics. They were ordinary people, and yet they were extraordinary: artists, grandmothers, businessmen, teachers, farmers, nurses; people of all ages, just as many over fifty as under. Quite a few have been old people, and the most moving letters were from women and men over eighty, and in two or three cases even over ninety!

What did *The Tao of Physics* touch off in all these people? What was it they had experienced themselves? I have come to realise that the recognition of the similarities between modern physics and Eastern mysticism is part of a much larger movement, of a fundamental change of worldviews, or paradigms, in science and society, which is now happening throughout the world and which amounts to a profound cultural transformation. This transformation, this profound change of consciousness, is what so many people have felt intuitively over the last four decades, and this is why *The Tao of Physics* has struck such a responsive chord.

From physics to the life sciences

During my lectures and seminars, men and women from all walks of life often told me that a similar change of paradigms was now happening in their various fields. This led me to expand my focus, and in my subsequent books I explored the change of paradigms in various other fields — in biology, medicine, psychology, economics, management, and so on.

To connect the conceptual changes in science with the broader change of worldview and values in society, I had to go beyond physics and look for a broader conceptual framework. In doing so, I realised that our major social issues

— health, education, human rights, social justice, political power, protection of the environment, the management of business organisations, and so on — all have to do with living systems; with individual human beings, social systems, and ecosystems.

With this realisation, my research interest shifted from physics to the life sciences, and over the last thirty years I put together the broader conceptual framework I was looking for, using insights from the theory of living systems, complexity theory, and ecology. It is a framework that integrates four dimensions of life: the biological, the cognitive, the social, and the ecological dimension. I presented summaries of this framework, as it evolved, in several books. My final synthesis was published by Cambridge University Press in a multidisciplinary textbook, titled *The Systems View of Life: A Unifying Vision*, which I coauthored with Pier Luigi Luisi, professor of biochemistry in Rome.

Extending the parallels

With my change of perspective from physics to the life sciences, I now see future elaborations of the thesis I presented in *The Tao of Physics* not so much in further elaborating the parallels between physics and mysticism, but rather in extending these parallels to other sciences. In fact, this is already being done.

After the publication of *The Tao of Physics* in 1975, numerous books appeared in which physicists and other scientists presented similar explorations of the parallels between physics and mysticism. Other authors extended their inquiries beyond physics, finding similarities between Eastern thought and certain ideas about free will; death and birth; and the nature of life, mind, consciousness, and evolution. Moreover, the same kinds of parallels have been drawn also to Western mystical traditions. Some of these explorations were initiated by Eastern spiritual teachers. The Dalai Lama, in particular, has held dialogues with Western scientists on numerous occasions.

The extensive explorations of the relationships between science and spirituality over the past three decades have made it evident that the sense of oneness, which is the key characteristic of spiritual experience, is fully confirmed by the understanding of reality in contemporary science. Hence, there are numerous similarities between the worldviews of mystics and spiritual teachers — both Eastern and Western — and the holistic, or systemic, conception of nature that is now being developed in several scientific disciplines.

The awareness of being connected with all of nature is particularly strong in ecology. Connectedness, relationship, and interdependence are fundamental concepts of ecology; and connectedness, relationship, and belonging are also the essence of spiritual experience. I believe therefore that ecology — and in particular the philosophical school of deep ecology, is an ideal bridge between science and spirituality.

When we look at the world around us, we find that we are not thrown into chaos and randomness but are part of a great order, a grand symphony of life. Every molecule in our body was once a part of previous bodies — living or nonliving — and will be a part of future bodies. In this sense, our body will not die but will live on, again and again, because life lives on. Moreover, we share not only life’s molecules, but also its basic principles of organisation with the rest of the living world. Indeed, we belong to the universe, and this experience of belonging can make our lives profoundly meaningful.

Thank you!

Fritjof Capra, Ph.D., physicist and systems theorist, is a founding director of the Center for Ecoliteracy in Berkeley, California. He serves on the faculty of the Amana-Key executive education program in São Paulo, Brazil. He is a Fellow of Schumacher College (UK) and serves on the Council of Earth Charter International. Capra is the author of several international bestsellers, including *The Tao of Physics* (1975), *The Web of Life* (1996), and *The Hidden Connections* (2002). He is co-author, with Pier Luigi Luisi, of the multidisciplinary textbook, *The Systems View of Life* (Cambridge University Press, 2014). Capra’s new online course (www.capracourse.net) is based on his textbook.
