

# Inside the Spirit Matrix<sup>1</sup>

## A contextualization of contemporary physics

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We take a close look at the laws of contemporary physics with a view to determining whether they can possibly be the laws governing a self-sufficient material reality. We find that they cannot. They reveal in so many ways that this apparently free-standing, objective reality exists within a larger Reality. It is created and sustained by an omnipotent Force. It is the manifestation of a single ineffable Being or Spirit.

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[M]atter, which we can now define only as that which satisfies the laws of physics, may be spirit insofar as... the spirit conforms to the mental operations of distinguishing and objectifying. We can explain causally... precisely to the degree to which spiritual reality can be objectified; in this objectified form it is called... matter.

[I]n the history of philosophy this identity has been variously expressed by asserting that the final reality is spiritual; what... we call matter is the mode in which this final reality is perceived by itself as alienated from itself.

C.F. von Weizsäcker (1980, pp. 234, 244)

## How do I know I'm not a brain in a vat?

In the 1999 Hollywood blockbuster film *The Matrix*, an enigmatic character called Morpheus tells Neo, a computer programmer and night-time hacker: "The world has been pulled over your eyes to blind you from the truth." Adi Shankara could have said that. To bring home his point, Morpheus asks Neo: "Have you ever had a dream that you were so sure was real? What if you were unable to wake from that dream. How would you know the difference between the dream world and the real world?"

How indeed would we know that this world is not a virtual reality created by something or someone beyond it, by whatever means, for whatever purpose? There are two ways to find out. One is a spiritual awakening to "That which being known all is known", *yasmin vijñāte sarvam vijñātam*. The other is to take a close look at this dream world, this world that has been pulled over our eyes. Let's look at it with the eyes of a physicist — a physicist living at the end of the 19th Century to begin with.

## An almost self-sufficient world

For this physicist the world was a multitude of "bodies" all having a mass and some carrying a charge, and these bodies were interacting via two kinds of force, electromagnetism and Newtonian gravity. What is important for us here is to separate the facts from the fictions.

- Fact is that the calculation of electromagnetic effects can be carried out in two steps: given the distribution and motion of charged bodies, we calculate a set of functions of position and time known as the "electromagnetic field", and using these functions, we calculate the electromagnetic effects that these bodies have on any other charged body.
- Fiction is that the electromagnetic field is a physical entity in its own right, that it is locally generated by charges, that it mediates the action of charges on charges by locally acting on itself, and that it locally acts on charges.<sup>2</sup>

The method that was used to turn fact into fiction consisted in the transmutation of a mathematical algorithm for calculating the effects that charges have on charges, into a physical mechanism or process by which charges act on charges. What made this transmutation possible was the fact that the electromagnetic action of charges on charges is retarded: causes precede their effects. Because the Newtonian gravitational action of one body on another is instantaneous, the same sleight of hand could not be applied to Newton's theory of gravity.

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2 Did you notice that this story fails to explain how a charge locally acts on the electromagnetic field, how the electromagnetic field locally acts on itself, or how the electromagnetic field locally acts on a charge? Apparently the familiarity of what *seems* to be local action (a kick in the butt, a slap in the face) makes us believe that local action is well understood.

Newton therefore famously refused to embroider his theory with a story purporting to explain how one body acts on another. But it could be applied to Einstein's theory of gravity, in which electromagnetic and gravitational effects are equally retarded, and after that it almost seemed as if the inventory of the world was complete and its processes were fully understood. "Almost", because by then it had become clear that some experimental findings were in striking disaccord with the predictions of what we now call "classical physics", notably the stability of atoms and the radiation emitted by a glowing hot object.

## Quantum quandaries

We may now fast-forward to the 21st Century. The general theoretical framework of contemporary physics is quantum physics. Here, too, we need to separate the facts from the fictions. Fact is that this theoretical framework is a probability calculus. Given the actual outcomes of measurements that have been made, we can calculate the probabilities of the possible outcomes of measurements that may be made. In other words, we have a bunch of statistical correlations between outcomes of measurements either performed on the same object at different times or performed on different objects at the same time. And that's it, as far as the facts are concerned.

Needless to say, this is a far cry from having an inventory of the world or understanding its processes. The crux of the matter is that the time-honored sleight of hand — the transmutation of mathematical tools into physical entities — no longer works. It is impossible to transmogrify the quantum-mechanical correlation laws into physical processes by which measurement outcomes determine the probabilities of measurement outcomes, let alone into mechanisms by which objects interact with each other. Philosopher of science Dennis Dieks (1996) has aptly summed up the situation by saying that

the outcome of foundational work in the last couple of decades has been that interpretations which try to accommodate classical intuitions are impossible, on the grounds that theories that incorporate such intuitions necessarily lead to empirical predictions which are at variance with the quantum mechanical predictions.

It is not hard to see why for those who wanted to incorporate the facts into a self-sufficient totality of material constituents and physical processes, the first order of business was to rid the theory of its inherent dependence on measurements. Apart from producing a variety of pseudo-problems and gratuitous solutions, these misdirected efforts have blinded everyone concerned to the one possible story that makes sense (Mohrhoff, 2000, 2002bcd, 2004b, 2005, 2006de). For this story to become intelligible, one must, in addition, stop asking: what are the ultimate building blocks and how do they interact and combine? These questions proceed from the assumption that what ultimately exists is a multitude — of particles, spacetime points, whatever. If you expect quantum mechanics to answer these questions, you will come to agree with some of the greatest physicists of our time that quantum mechanics makes absolutely no sense.

## One Being and its manifestation

The right questions to ask proceed from the assumption that what ultimately exists is a single, intrinsically ineffable Being. How does this manifest itself? How does it come to constitute an apparent multitude of objects? How does it realize their properties? If you turn to quantum mechanics with these questions, you will be surprised at the straightness of the answers. Among them is the most economical creation story ever told: by entering into spatial relations with itself, this single, intrinsically ineffable Being gives rise to both matter and space, for space is the

totality of existing spatial relations, while matter is the corresponding apparent multitude of relations — apparent because the relations are *self*-relations.

If space only contains the spatial relations that hold among objects, then it does not contain objects. It only contains their *forms*. The form of a composite object is the totality of its internal spatial relations. Objects that lack internal relations — like quarks (which are instrumental in the manifestation of protons and neutrons) and electrons (which together with protons and neutrons serve to manifest atoms and molecules) — are therefore formless. Not only are these so-called "ultimate constituents of matter" formless, but if we consider them by themselves, out of relation to each other and the rest of the world, they lack properties altogether. The reason this is so is that physical properties are defined in terms of either spatiotemporal or dynamical *relations*.

According to a philosophical principle known as "the identity of indiscernibles", A and B are one and the same thing just in case there is no difference between A and B. Not only is there no difference between the properties of any of the so-called "ultimate constituents of matter" (inasmuch as they have none) but quantum mechanics also rules out the existence of individualizing substances. These are some (though not by any means all) of the reasons why the true number of "ultimate constituents" is *one*.

## Quantum supervenience: to be is to be measured

All of quantum theory's many baffling features<sup>3</sup> are subsumed and eclipsed by the supervenience<sup>4</sup> of the microscopic on the macroscopic, which flies in the face of a twenty-five centuries old paradigm. The microworld of molecules, atoms, and subatomic particles is what it is because of what happens or is the case in the macroscopic world, rather than the other way round as we are prone to think. In the quantum world, *to be* is to be *measured*. A property exists only if, only when, and only to the extent that its possession can be inferred from an actual event or state of affairs. By the same token, a measurable quantity has a value only if, only when, and only to the extent that a value is indicated. This is the reason for quantum theory's inherent dependence on measurements, which obviously has not been understood by those whose aim is to rid the theory of this dependence.

If quantum mechanics tells us how the world has been or is being manifested, rather than how things are put together, then this dependence is not that hard to understand. If you experience something the like of which you never experienced before, you are obliged to describe it in terms of familiar experiences. Similarly, what lies "behind" the manifested world can only be described — in fact, can only be *defined* — in terms of the finished product — the manifested world. Quantum mechanics affords us a glimpse "behind" the manifested world — the macroworld — at formless particles, non-visualizable atoms, and partly visualizable molecules, which, instead of being the world's constituent parts or structures, are *instrumental* in its manifestation. But in order to describe what lies "behind", we must refer to what happens or

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3 According to Schrödinger (1935), entanglement is "the characteristic trait of quantum mechanics". According to Misner *et al.* (1973), the central mystery of physics is the "miraculous identity" of particles of the same type. According to Feynman *et al.* (1965), the double-slit experiment with electrons "has in it the heart of quantum mechanics". According to Stapp (1975), Bell's theorem (establishing the inconsistency of quantum mechanics with a locally definite world) is "the most profound discovery in science".

4 Supervenience is a technical term of philosophy for a non-specific relation of determination between two types of properties. Properties of type B are said to supervene on properties of type A if objects cannot differ in their B-properties without differing in their A-properties.

is the case "in front".

## Physics: the art of knowing without knowing

Since the word "fundamental" does not have a comparative, a theory is either fundamental or it is not. If a physical theory is fundamental and complete, then it is capable of explaining everything else and therefore incapable of being explained by anything else — except teleologically, by pointing out the reasons why it has the particular form that it does.

One of the reasons why the general theoretical framework of contemporary physics has the particular form that it does, is that without it stable objects could not exist. Specifically, the existence of objects that

- have spatial extent (they "occupy space"),
- are composed of a (large but) finite number of objects without spatial extent (particles that do not "occupy space"),
- and are stable (they neither explode nor collapse as soon as they are created)

requires the fundamental theoretical framework of contemporary physics to be exactly what it is (Mohrhoff, 2006a). Since this framework presupposes measurement outcomes, its consistency requires the existence of measurement outcomes, and it is eminently plausible that the existence of measurement outcomes in turn requires the validity of all empirically tested physical theories — namely, the so-called "standard model" and Einstein's theory of gravity — at least as effective theories<sup>5</sup> (Mohrhoff, 2002a).

This is a humbling result, for it means that all empirically tested physical theories are essentially tautological. If you want spatially extended objects that neither explode nor collapse the moment they are formed, the validity of these theories is guaranteed. To be precise, their validity is guaranteed *if* spatially extended objects are composed of objects that lack spatial extent. This is the sole nontrivial input and the only real mystery. Why are things that "occupy space" made of finite numbers of things that don't?

It certainly does not have to be that way. Why should Being be incapable of manifesting itself via a continuous substrate rather than via a particulate one? In fact, Sri Aurobindo (1972, Book I: Chaps. XXVI, XXVII, Book II: Chap. XXI) assures us of the existence of an ascending series of non-evolutionary worlds, and in these supraphysical worlds the reason for the particulate constitution of physical matter does not exist. It is unique to Being's *evolutionary* manifestation. The creation of a world of formless particles is the final stage of an *involution* that sets the stage for Being's adventure of evolution (Mohrhoff, 2004, 2006bc).

## An incomplete world

Since the early days of quantum physics it has been claimed, most famously by Einstein, that the theory is incomplete. What is actually incomplete is not the theory but the physical world, and this in several ways.

For one, it is incomplete as compared to certain theoretical expectations, which have psychological underpinnings (Mohrhoff, 2001a, 2006df), but which are physically unwarranted. One of these expectations is that space is an intrinsically and completely partitioned expanse. In reality, the spatial differentiation of the physical world is incomplete. It doesn't go "all the way

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5 Effective theories are theories that are valid over many but not all scales of length.

down". If in our minds we partition the world into smaller and smaller spatial regions, there comes a point beyond which these regions, or the corresponding distinctions, do not correspond to anything in the physical world.

There are therefore (at least) three reasons why an adequate theoretical model of the physical world cannot be built "from the bottom up".

- The first, as you will remember, is the numerical identity of the so-called "ultimate constituents of matter" (considered out of relation to their relations). This prohibits the construction of a world model by assembling a pre-existent multitude of building blocks.
- The second reason is the supervenience of the microscopic on the macroscopic; there is no self-existent microworld that could serve as foundation for the macroworld.
- And the third is this incomplete spatial (as well as temporal) differentiation of the physical world, which prohibits the construction of a world model on the foundation of an intrinsically differentiated space or spacetime.

As it is said in the Rig Veda (Sri Aurobindo, 1972, p. 889), *the foundation is above*.

Another incompleteness of the physical world is the absence of a micro-causal nexus. As mentioned already, it is impossible to interpret the quantum laws as describing physical processes by which measurement outcomes determine the probabilities of measurement outcomes, let alone as mechanisms by which objects act on each other. Quantum mechanics presupposes property-indicating events, and so it cannot account for the occurrence of such events. The theoretical framework of contemporary physics is incapable of providing causally sufficient conditions for the events that it serves to correlate (Ulfbeck & Bohr, 2001; Mohrhoff, 2002d), and the assumption that such conditions nevertheless exist invariably leads to predictions that are inconsistent with it. These events *lack* causally sufficient conditions.

Searching for causal explanations of the quantum-mechanical correlations is putting the cart before the horse. It is the laws that govern these correlations that determine the extent to which causal concepts can be used. Such concepts are useful inside the macroworld — the *manifested* world — in which the statistical correlations of quantum mechanics degenerate into deterministic correlations, inasmuch as only the latter kind of correlations can be understood in terms of relations between causes and effects.<sup>6</sup>

## Time and causation

The causal links that exist between events in the manifested world — and this is the punchline — are parts of this world and therefore are not involved in its manifestation. Nor is there such a thing as a micro-causal nexus underlying and supporting the macroworld. We are led to conceive, instead, of an entirely different kind of causality — the causality by which a single, intrinsically ineffable Being manifests itself, or by which the macroworld emerges from it. This is not a causality that acts across space and time, nor an emergence in time. It is a causality that proceeds from a Being beyond space and time. We ought to appreciate how well this accords with our earlier conclusions:

- The shapes of things resolve themselves into sets of relations between formless objects.

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6 The temporal asymmetry associated with the cause-effect relation, however, is an aspect of the way we *experience* the world rather than an aspect of the *physical* world (Mohrhoff, 2001b, 2002b, 2006f).

- Space, being the totality of existing spatial relations, only contains the shapes of things; it does not contain the formless objects.
- These formless objects (considered out of relation to their relations) are identical not in the weak sense of exact similarity but in the strong sense of numerical identity.

And there is more. We are accustomed to the idea that the redness of a ripe tomato exists in our minds, rather than in the physical world. We find it rather more difficult to accept that the same is true of the experiential *now*: it has no counterpart in the physical world. The proper view of physical reality is not only what Thomas Nagel (1986) has called "the view from nowhere" but also what Huw Price (1996) has called "the view from nowhen" (Mohrhoff, 2001a, 2002b, 2006df).

The view from nowhere and nowhen is Being's aperspectival<sup>7</sup> view of its manifestation. The perceptual quality of this four-dimensional manifold, however, may be as different from the perceptual quality of the three-dimensional manifold of space as this is from the perceptual quality of the one-dimensional manifold of time. In other words, Being's view of its manifestation may be so different from ours as to be completely unimaginable. Sri Aurobindo (1972, p. 133) confirms this when he writes:

At certain moments we become aware of such an indivisible regard upholding by its immutable self-conscious unity the variations of the universe. But we must not now ask how the contents of Time and Space would present themselves there in their transcendent truth; for this our mind cannot conceive[.]

What can we learn from contemporary physics concerning the Force by which Being manifests itself? In the quantum world everything is possible — that is to say, every conceivable measurement outcome has a probability greater than zero — *unless* it violates a conservation law. We never have to explain why something is possible. We only have to explain why certain things are not possible. This is not the characteristic of a force subject to rigidly mechanical laws. This reveals the working of a minimally constrained *omnipotent* force. By "minimally constrained" I mean that the only constraint imposed on it is that it has to manifest a world containing stable objects that (i) "occupy space" and (ii) are "made of" finite numbers of objects that don't. In other words, it has to set the stage for Being's adventure of evolution.

## Conclusion

We have taken a close look at the laws of contemporary physics with a view to determining whether they can possibly be the laws governing a self-sufficient material reality, and we have found that they cannot. They reveal in so many ways that this apparently free-standing, objective reality exists within a larger Reality. It is created and sustained by an omnipotent Force. It is the manifestation of a single ineffable Being or Spirit. We live inside the Spirit Matrix.

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<sup>7</sup> The term is used here in the sense introduced by Jean Gebser (1985).

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