

Quantum physics and consciousness – a clarification

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In circles of “new thinking”, esotericism and alternative healing methods, the terms “quantum physics” and “quantum XYZ” (replace XYZ with any word you can think of) are meanwhile being used with inflationary frequency. An open mind might wonder which revolutionary new findings have led to such a wondrous synthesis of natural science and esotericism, whereas hardcore sceptics will rather tend to believe what one of them wrote in a book review on Amazon: “It looks like some people refer to quantum physics in an attempt to make the world of the paranormal and esotericism respectable through the backdoor.”

In fact, a closer look at all the stuff being “quantified” that way leads to some disenchantment. All too often we hear or read the claim that quantum physics clearly proves that our consciousness is the ultimate creator of the physical world. If you know my book [The Making of Reality – How Consciousness Creates the World](#), you know that I do in fact agree with the second part of this claim. However, in the interest of the credibility of all those striving for serious research in this field, it is all the more important to me to point out that we are almost as far from an actual proof today as we were 80 years ago, when quantum physics first shattered the conventional world view.

So let's take a closer look. Simply speaking, quantum mechanics is basically nothing more than a well-functioning (and thus legitimate) system of formulas that can be used to calculate the probability to find specific elementary particles in specific places when looking for them there with suitable measurement equipment. Not more and not less. The actual revolution, however, is that those elementary particles obviously don't exist at all until the above happens: a measurement that forces the particle to appear. Before that, they rather behave like wave structures distributed in space that interact with each other, thus building up new probability distributions. It is these wave-like distributions that can be calculated with the quantum formulas.

The most popular example is the classical double slit experiment: If you shoot electrons or other particles (including photons, i.e. light particles) through two parallel slits very close to each other, a fluorescent screen placed behind the slits at some distance, which makes the impact positions of the individual particles visible, will show an interference pattern that can be explained with the superposition of the probability waves emanating from the two slits. Once you cover one of the slits, the pattern disappears and is replaced by an ordinary density distribution.

Interestingly, however, the whole thing still works if you only shoot single particles through the double slit one by one. Even though, according to the classical notion, each particle can take only one of the two possible paths, it still obeys the probability distribution prescribed by the two slits and, together with its fellows arriving one by one, forms the familiar interference pattern on the screen again – but not if one of the two slits is covered. It looks as if the particle somehow “knew” whether the second slit is open or closed. Since we would hardly consider an electron that farsighted, it is more reasonable to assume that the electron took in fact *both paths at the same time* and thus was no particle in the classical sense at all until the screen forced it to appear as such. Before that, it was merely some sort of “possibility wave”.

The fact that a certain degree of mysticism began to show up in some interpretations of the research results already in the 1920s is not least caused by an imprecise interpretation and confusion of the terms “measurement” and “observation”. They can refer to a purely technical process, but also to perception by a conscious mind. Now if one postulates that the quantum wave “collapses” and appears as a particle in the moment of an “observation”, a listener or reader can be quickly lead to the conclusion that it is the conscious mind that turns the probability into a reality. In fact some of the early quantum physicists tended towards this assumption.

As already mentioned, I actually advance this view myself, therefore I am acting as the devil's advocate here in the interest of a clean argumentation. Because we must realise that this conclusion is simply premature in this place. What forces the particles to appear is the screen, not the observer's mind. And what makes the interference pattern disappear is not the observer's intention, but his or her interaction with the measurement setup (covering one of the slits). Both processes work reliably, regardless of the observer, and are thus just as "objective" as the fact that a stone you drop will fall to the ground (under normal Earth conditions).

In the last few decades, the interaction of quantum waves has been examined in much more detail, and what the classical Copenhagen interpretation referred to as a – not indubitably explainable – "collapse of the wave function" (which turns the wave into a particle), is now explained with the term "decoherence": It was shown that the interaction between particles, i.e. quantum waves, and their environment forces any superposition states of multiple possibilities, as can be observed (indirectly) in the double slit experiment, to disappear, leaving behind only clearly defined states with a sufficiently high probability density, i.e. particles in certain positions. This effect becomes stronger the more particles are involved, which is the reason why wave superpositions (interference patterns) can only be observed with very small objects like elementary particles or atoms, but not with macroscopic objects, such as footballs or cats (this means that Schrödinger's legendary cat is either dead or alive, but nothing in between). In case of the double slit experiment, decoherence becomes effective in the interaction between the particle wave and the screen, which forces a particle to appear in a clearly defined position, whereas at the double slit several possibilities can still exist in parallel.

These findings have led to a modern interpretation of quantum mechanics referred to as "Consistent Histories". A consistent history is an "allowed" sequence of quantum states resulting from decoherence due to the interaction of the involved matter. "Impossible" states, such as a superposition of two different flight paths of a football, are excluded, whereas such superpositions are still allowed as long as only few individual particles are involved.

As we can see, so far there is no need to assume an influence of consciousness. So if someone claims – and many people do so unfortunately – that the double slit experiment clearly proves such an influence, this person is wrong and bears a risk not to be taken serious by people familiar with modern physics.

So where is it that consciousness comes into play? The "Consistent Histories" interpretation merely explains which quantum states are possible (i.e. observable) and which are not. In general, however, there are always *several* of these allowed states, and there is no generally accepted explanation as to which of them actually occurs, i.e. how a specific reality is *selected* from a number of possible realities based on allowed quantum states.

So the question is not how and why a wave turns into a particle in the double slit experiment, but why the particle impacts exactly in *this* position and not in any other position that would have been equally permissible within the interference pattern. We can merely make statements about the average behaviour of a large number of particles, but we cannot exactly predict the behaviour of individual particles – and this is not because we don't exactly know the boundary conditions, but due to the immanently statistical nature of quantum mechanics.

There are three widespread models of explanation. The first: The position is chosen randomly by chance. The second: No choice takes place at all, but each possibility takes place in a separate, parallel reality (Many-Worlds interpretation). The third: The result is chosen by the observer's consciousness. Quantum mechanics itself does not in any way help us in deciding in favour of one of these explanations – so much for its alleged evidentiary value.

One aspect in favour of the random chance hypothesis is that apparently our reality in fact widely follows statistical laws. However, there is no explanation as to what random chance actually is and where it comes from. It cannot be substantiated within the established laws of physics, it can only be observed as an empirical phenomenon – its existence as a selecting instance is therefore simply assumed.

The Many-Worlds interpretation elegantly removes the need for a selecting instance, but an unpleasant side-effect is that it denies us our free will, because if all possible realities take place in parallel, nothing and nobody ever actually influences the course of the world – it would merely appear to us that way, since each parallel instance of ourselves would only experience its own variant of reality.

In a world entirely controlled by random chance, on the other hand, there would be just as little room for free will. Therefore, at least regarding our emotional comfort, all this speaks in favour of the assumption that consciousness does play a role in the selection of quantum states, granting us actual influence on our reality. From a scientific point of view, of course, this cannot be a criterion. We therefore need evidence or at least indications for such an influence. And for the reasons stated above, we will not find it in quantum physics.

We must therefore turn towards the classic discipline that examines mind-matter interrelations: parapsychology. In the eyes of many people, this already expels us from the realms of those who can be taken seriously. We will have to live with that – and accept the fact that the widely accepted laws of quantum physics merely provide us with open questions that leave room for the assumption of an influence of consciousness on reality (and even suggest such an influence from my point of view), but regarding the collection of evidence, we must rely on fields of study that are far less accepted.

And again, if we want to be prepared for discussions with sceptics, we must be aware of the fact that the level of evidence in this area is somewhat limited so far.* There are experimental results showing a significant influence of a subject's intention on the results of statistical physical processes – although the influence is usually very small (in the PEAR experiments, which are probably the best-documented, it had a magnitude of a few changed bits among thousands). However, there are also numerous studies where such results could not be reproduced. In fact, parapsychology even observes an apparently systematic effect causing the significance of the results of psychokinesis experiments to decline with an increasing number of repetitions – of course, this is grist to the mill of the sceptics, who claim that this shows that the experiments were simply not conducted properly at the beginning – any they are probably right in some cases.

However, if we do believe in the relevance of the results, we could also explain this effect with the increasing influence of the consciousness of sceptic minds that erodes the evidence of the results – or maybe the fact that the more the results become known to the public, the influence of collective consciousness increases, which tends to declare events outside the established belief systems “invalid”.

People experienced in macroscopic reality creation (“law of attraction”, “transurfing”, etc.) often don't see any need for “evidence” – their lives are already full of it (from their subjective point of view). In fact, some of the miracles reported by such people are more than impressive. From a scientific point of view, of course, it is as good as impossible to assess the actual degree of evidence in such events, because unlike a controlled laboratory experiment, such events are subject to an unmanageable number of external influences. The mere influence of one's attitude and beliefs on one's selective perception, as well as the subconscious manipulation of other people in rather conventional ways, are factors that are widely underestimated.

At any rate, I strongly advise anyone dealing with “esoteric” influences (in the widest sense) on reality to be careful with references to quantum physics in order to substantiate such claims. What might look, at first glance, like a welcome bridge between the established and the new world view – and thus between the advocates of both – can easily backfire in case of inaccurate reasoning and thus even add to the “dubious” image often attributed to such new approaches. And that cannot be in the interest of an open dialog.

** **Addendum (August 2011):** Meanwhile I learned about additional research results, according to which the level of evidence is not that limited any more. A meta-analysis conducted in 1989, which covered more than 800 studies on psychokinesis (including those without significant results) showed that despite the ambiguous results, psychokinesis is a statistically robust effect. This means that the probability that the positive results were merely caused by chance, errors, or fraud is negligibly small – according to this analysis, it is less than one in a trillion. Therefore, psychokinesis can be considered a proven phenomenon by scientific standards.*