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QUANTUM THEORY AND BERGSON'S CONCEPT OF TIME: IS IT POSSIBLE TO RECONCILE DURATION AND QUANTUM TIME?

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Abstract: In 1922, Albert Einstein rejected Bergson's concept of time. He even declared that Bergson's duration did not exist, something that Bergson never quite came to terms with. On the other hand, some of Bergson's reflections indicated that in a certain respect he was close to the spirit of modern physics, especially quantum theory. The author, therefore, asks whether it is possible to equate Bergson's duration with the quantum space-time continuum and thus rehabilitate Bergson's concept. The first part of the article, in addition to the definition of duration, focuses on the connection of the subject, time, and matter in Bergson, which represents one of the points of contact with quantum theory. The second part describes the role of the subject in quantum theory. The third part presents the definition of the mentioned space-time continuum. The final section compares the two concepts and answers the research question.

Keywords: Bergson; quantum physics; time; duration; subject; space-time continuum

Introduction

In 1922, Albert Einstein met Henri Bergson to debate the topic of time. Although Bergson raised several objections to Einstein's theory, the purpose of his speech was not primarily a criticism as what he wanted above all was to show a possible connection between the theory of relativity and his own concept of time. However, reconciling the theory of relativity with the concept of duration proved to be more than problematic. Einstein even declared that the time Bergson talked about did not exist, something Bergson never came to terms with. (Séance du 6 avril 1922, 364) Soon after the debate, Bergson's *Durée et Simultanéité* was published, in which he dealt with this issue. The book sparked further debate in which Bergson's supporters linked his concept to a new physical theory, namely quantum mechanics. For example, Jacques Chevalier saw a certain connection between Bergson's philosophy and quantum mechanics in wave-particle duality. (Chevalier 1924, 185) Louis de Broglie also connected new physical findings with Bergson's concept. In the article *Les Conceptions de la physique contemporaine et les idées de Bergson sur le temps et sur le mouvement*, for example, he points out with Bergson how science has always and almost without discussion considered time as a simple variable, a straight line that can be placed in space, thereby stripping it of certain properties essential to real time. In connection with Bergson's concept of movement, matter and indeterminism, de Broglie also finds a certain analogy with Heisenberg's uncertainty principle. (de Broglie 1941, 250) Joël Dolbeault in his article *From Mind to Matter: How Bergson Anticipated Quantum Ideas* also deals with this topic in more detail for example.

Unfortunately, none of the mentioned connections between quantum mechanics and Bergson's concept solve the problem of the non-existence of Bergson's time, and, therefore, I will only cover them marginally. However, in order to deal with the problem of the existence or non-existence of duration, I will focus on another point of contact between the two concepts. It lies in the blurring of the boundary between the subject and the recognized object, in their interconnectedness (and also the interconnectedness of time). This interconnectedness is evident in Bergson precisely in the subject's relation to duration, which is partly the subject's internal time, but is also the basis for the external world. In quantum mechanics, this interconnectedness manifests itself at the moment of measurement, in which there is a kind of "realization" of time, caused by the collapse of the wave function due to our observation. It is due to this connection that it is possible to arrive at a definition of a quantum space-time continuum, which at first sight has aspects very similar to Bergson's duration.

So, the question is whether it is possible to identify duration with the mentioned space-time continuum and thus ensure the support of Bergson's concept. Or was Einstein right after all when he declared that duration does not exist?

In order to answer the proposed questions, I will first focus on the interconnectedness of the subject, time and matter in Bergson's concept, then I will explain the role of the subject in quantum theory through a double-slit experiment, and, finally, I will present the definition of the space-time continuum, which I will compare with duration and also point out related problems.

The Interconnectedness of the Subject, Duration and Matter in Bergson's Conception

The subject, together with duration, are the central notions of Bergson's concept and, as we will see later, are also closely related to his concept of matter. As for the subject, for Bergson the starting point is the so-called first-person level, or the concept of the self. Through introspection and investigation of mental processes, he attempts to grasp the inner processes in their true and undistorted form. The key concept related to the subject in this regard is precisely duration, because if we speak of its pure form, then the sequence of our conscious states takes on this form at the moment "when our ego lets itself live, when it refrains from separating its present state from its former states." (Bergson 2001, 100) In other words, if the self merges with the stream of qualitative changes, then it perceives duration in its true form. Thus, there is an obvious correspondence between the subject and duration.

Duration can be recognized by the subject through the fundamental self, but the superficial self is also a part of the subject as its second component. It must be added that the fundamental self is associated with intuition, the superficial self with the intellect. (Bergson 2001, 128–129) According to Bergson, experiencing the true self in its basic form takes place for example in sleep, when the self is freed from superficial psychological states, it is relaxed in its own way and disconnected from the outside world. After awakening, however, the events of our inner life intersect with external phenomena, dividing the duration into segments that are depicted in the same way as the external elements. Thus, we attain our habitual conception of self and of states and how they are materialized and distributed in homogeneous space. It is the outer, surface layer of our social self. (Bergson 2001, 125–129)

Our conscious life can therefore be perceived either through space or directly. If we incline to direct perception, we access our own deeply rooted states of consciousness, which must be understood in terms of quality, not quantity. This means that even though they are qualitatively different, we cannot say whether they are one or several states, and we cannot individualize them without changing something in their nature. Such deeply rooted conscious states constitute duration itself, the elements of which contain non-numerical multiplicity and are therefore indistinguishable from one another. However, the view of one's self is only possible when the subject does not participate in public life and immerses himself in his own being. Indeed, social interaction forces the interpretation of the conscious flow, thereby disrupting the aforementioned inner insight. In its basic form, the *self* is self-enclosed and incommunicable since any attempt to externalize psychic events involves their juxtaposition and spatial arrangement. The transfer of mental states into space, their separation and grasping with the help of words are then a precedent for any communication. (Bergson 2001, 131–134)

Bergson considers duration itself to be the only real time (durée réelle), which, although it forms our inner reality, is also inherent in the external, i.e., material world. It is, therefore, necessary to emphasize that even though duration is perceived through the subject, this time is objective in the sense that it is common to all things and beings. It is therefore not a time that exists only as a product of perception having no independent existence.

However, duration is knowable only by intuition and is immeasurable. It cannot be measured because it is inherently indivisible, but measurement requires division and comparison. The transition from pure duration to measurable time therefore lies, according to Bergson, in movement itself. This is because we associate movement with a trajectory, thereby spreading it along an imaginary curve in space. The curve described by the movement is made up of individual points, placed next to each other, which can be measured. According to Bergson, what we are comparing is a quantitative sequence of parts, therefore time converted into space, as homogeneous time. (Bergson 2001, 85–92) However, Bergson considers such (physical) time to be fictitious (temps fictif). Physical time[1] can be transformed into a space in which its discontinuity is manifested, while duration, on the other hand, is characterized by continuity, heterogeneity and simplicity. (Deleuze 1991, 38).

But if the material world is given a real duration, whereby the duration of matter is no longer our inner duration projected into motionless space (as it was in *Time and Freewill*) but a specific development of the external world, we must break free not only from the formal scheme of time, but also from ideas of a homogeneous empty space into which we place specific contents, and proceed to the extension of matter itself. The extension of matter is not an unsubstantial form of a homogeneous environment, but the vastness of specific contents. (Bergson 1919, 241) Therefore, the mentioned continuity and discontinuity cannot be considered as opposing forms, but as two completely complementary and inseparable aspects of the same physical reality. These two aspects refer, according to Chevalier, to the dual

[1] Even though homogeneous time is illusory from the point of view of its conception, it does not deny several important functions. This is, for example, the creation of reference points for our orientation or the possibility of planning our actions. According to Bergson, physics has the right to replace time with space for the purpose of measurement, but it can never capture reality in its absolute completeness. Only the knowledge of real time is the way to the knowledge of reality as such. (Bergson 2001, 88–97)

nature of matter, which was confirmed by new X-ray research at the beginning of the twentieth century.[2] (Chevalier 1924, 185)

Bergson solves the transition from continuity to discontinuity, therefore the transition from internal to external, precisely by introducing the concept of extension. Not only does matter qualitatively extend, Bergson attributes a certain extension to qualitative ideas on the part of the subject as well. Extension as a specific form of duration is thus a link between the subject itself and matter. Only a temporal distinction will show that the difference between spirit and matter is only in degree and not in substance, which opens up the possibility of knowing matter as such. Thanks to the fact that our perception takes place in the matter itself, it basically coincides with it and shows us everything or at least the main thing from the matter. In pure perception (where memory, as a subjective component, is absent) we are as if outside ourselves and touch the reality of things, subject and object merge at this moment. In this way, in the act of pure perception, consciousness connects with matter, but is nevertheless radically different from it. According to Bergson, it differs from it in that the memory still remains in it, which manifests itself as a synthesis of the past and the present with regard to the future. (Bergson 1919, 294–295)

The blurring of the boundary between time and its concrete filling (matter) is also directly reflected in the blurring of the boundaries of the contours of physical bodies and elementary particles, because Bergson assumed that matter is not a collection of absolutely different elements, but only has a certain degree of division. Joël Dolbeault here points to a certain connection with quantum physics, which drew attention to the gradation of matter through its experiments. They showed, as indicated above, that "under certain conditions, a single particle can have a much greater extension than a corpuscular extension, because it can behave like a wave. Otherwise, a lot of empirical facts are not understandable. But at the same time, they have good reasons to think that a single particle behaving like a wave remains an undivided reality, because when this particle interacts with another physical system, its wave extension can suddenly become a corpuscular extension." (Dolbeault 2012, 29)

However, let us go back to duration, because for a complete list of its aspects, we need to mention how, according to Bergson, three time planes coexist in duration - past, present and future.[3] When we describe a period of time as past, we are comparing it to the present, i.e. to our current position. (James 2014, 16) From this perspective, the past appears as what has already been, that is as something that has ceased to exist. According to Čapek, this "alleged" unreality of the past is a possible reason why the past itself is rarely the subject of systematic philosophical investigation. Yet it seems that past events may have some kind of existence.

[2] „C'est ainsi que la lumière, après avoir été réduite par la théorie de l'émission à un mouvement de corpuscules, puis par la théorie de l'ondulation à la propagation d'un mouvement vibratoire dans un milieu continu, nous apparaît à l'heure actuelle depuis les plus récentes recherches sur les rayons X, comme fille du continu et du discontinu, de l'atome et du mouvement." (Chevalier 1924, 185)

[3] To compare these individual time segments by abstracting them from reality, it would be highly challenging to find criteria to distinguish them from each other. Time that is abstracted from physical events and any other markers for distinguishing the present from the past is the basis of continuous flow - therefore time conceived in this way would have neither past, present nor future parts, nor would it have a direction of flow since all these features can only be distinguished by the effect of physical (2nd law of thermodynamics) or psychological (consciousness) content. The question is whether such time, which would probably be hardly imaginable, exists in itself or is only a theoretical consideration. If we insist, like Bergson does (in *Time and Freewill*), only on the temporal component of reality separated from all space, a risk that time will lose its meaning exists. It is therefore necessary to understand the mentioned time segments along with their physical or psychological content. (Fell 2007, 118–119)

(Čapek 1991, 26) For Bergson, time is an indivisible continuity of unfolding, and, in this continuity, the past always remains in the present.[4] Time is literally a condensation of past and present, making what was an inseparable part of what is. According to Bergson, presence is "being the invisible progress of the past gnawing into the future." (Bergson 1919, 194) As for the future, according to Bergson, it is completely unpredictable, because duration is "unceasing creation, the uninterrupted up-surge of novelty". (Bergson 1944, 16) It is therefore a mistake to think that it is theoretically possible for the future to be contained in the present as determinism assumes. All our assumptions about future states are thus only judgments about the present character of the given situation or the past but not about the future as such. (Bergson 2001, 183–184) It is still necessary to emphasize that recognizing time as a reality even in the material world means that even material events will contain a certain albeit very small degree of indeterminacy. Bergson's defense of indeterminism is another point of contact with quantum theory mentioned in professional circles. According to de Broglie, as I already mentioned in the introduction, Bergson's insight foreshadowed Heisenberg's uncertainty principle, not only in connection with duration, but above all with his concept of movement.[5]

However, a detailed overview of Bergson's concept of movement, its interpretation and connection with the uncertainty principle is beyond the scope of this paper, so I will not deal with them further. After all, the relation of Bergson's philosophy to quantum theory is not the main problem, what interests us above all is the possible support of his concept of time.

An important point in Bergson's reflections is therefore the emphasis on the interconnectedness of time and matter, while the given subject is also an inseparable part of them, but not a necessary condition for their existence. This connection points out that no object can be examined in complete isolation. Now we will see what role the subject represents in quantum theory and how we can use it to distinguish time itself.

The Role of the Subject in Quantum Theory

In the time before the development of quantum theory, classical physics assumed that the world and the experiments with their results were independent of us, that the world could be described without talking about us. It was an idea of reality independent of our experience. However, quantum theory has shown that when investigating quantum phenomena, there are always connections and interactions between the object of observation as one system and the instrument of observation as another system, and that the interaction is expressed by a certain exchange of energy and momentum between the two systems. Thus, the description of a system in quantum theory is not independent of our decision about the way of asking questions, the choice of experimentation and observation. (Grygar 2008, 140–141) In other words, no factual statement can be made about a given natural object without coming into contact with it. According to Schrödinger, this interaction is a real physical interaction, even though it only consists in our "looking at the object". The object is affected by our

[4] Here, however, it is necessary to point out that there is a certain difference between psychological and physical duration in terms of tension and the mentioned condensation, which are smaller in the duration of the material world. (Čapek 1939, 77)

[5] „Bergson paraît avoir pressenti ce point quand il a écrit: « Il n'y a dans l'espace que des parties d'espace, et, en quelque point que l'on considère le mobile, on n'obtiendra qu'une position. » Il aurait pu dire en empruntant le langage des théories quantiques : « Si l'on cherche à localiser le mobile, par une mesure ou une observation, en un point de l'espace, on n'obtiendra qu'une position, et l'état de mouvement échappera complètement. » Mais il écrivait les lignes qui viennent d'être citées en 1889, près de quarante ans avant l'apparition dans la science des incertitudes d'Heisenberg!" (sic) (De Broglie, 1941, 250)

observation therefore we cannot gain any knowledge about the object if we completely isolate it. (Schrödinger 2013, 125)

Wheeler even suggested that it is precisely the act of our questioning that creates or modifies the subject under investigation. In other words, the world shows us such a face that depends on the nature of the question we ask. (Wheeler 1980, 354–356) Therefore, during the measurement process, it is not necessary for a conscious subject to be really present, for example, in the form of a researcher, it is sufficient to place the device here, with the help of which we mentally ask the mentioned questions. Even if we are the ones asking.

After all, also according to Schrödinger: "[…] the observer is never entirely replaced by instruments; for if he were, he could obviously obtain no knowledge whatsoever. He must have constructed the instrument and, either while constructing it or after, he must have made careful measurements of its dimensions and checks on its moving parts […] in order to ascertain that the movement is exactly the intended one. True, for some of these measurements and check-ups the physicist will depend on the factory that has produced and delivered the instrument; still all this information goes back ultimately to the sense perceptions of some living person or persons, however many ingenious devices may have been used to facilitate the labour. Finally, the observer must, in using the instrument for his investigation, take readings on it, be they direct readings of angles or of distances, measured under the microscope, or between spectral lines recorded on a photographic plate. Many helpful devices can facilitate this work […] But they must be read! The observer's senses have to step in eventually. The most careful record, when not inspected, tells us nothing." (Schrödinger 2013, 162) Our cognition is thus bound to the subject, which is part of the object being cognised. However, it is necessary to keep in mind, as Heisenberg already emphasized, that under no circumstances is this about introducing subjectivist features into the description of nature. Processes and statements about the system are always completely objective. (Heisenberg 1989, 90)

The role of the subject in quantum theory is very well illustrated by the well-known double-slit experiment, through which I will also arrive at the definition of the space-time continuum, which I will compare with Bergson's duration in the end. In the aforementioned experiment, it has already been proven many times that the same micro-object (electron, photon, etc.) has "by itself" both a particle and a wave nature, up to the moment of measurement. However, what form it will show us in a given experiment depends on the very specific arrangement of the experiment being carried out. Micro-objects "by themselves" are so-called faceless micro-objects, and only at the moment of measurement do they put on the appropriate "mask" for us, always in accordance with our choice – if we detect a realized path, the mask takes the form of a particle, if we are unable to trace the path even to determine the principle, it has the form of a wave. As soon as an observer makes a measurement that makes it possible to distinguish between these states, the wave function collapses into a single state. (Podolský, 1998) It is during the observation that a kind of physical and unique connection between the mentioned subject and the object occurs. However, it is necessary to emphasize that the collapse of the wave function also occurs under other circumstances, for example as a result of the action of matter, another particle, etc. I present this specific example here in order to outline the role of the subject in quantum theory and to arrive at the definition of the already mentioned space-time continuum, which we will now focus on.

A Quantum Mechanical Model of the Space-Time Continuum

An unimaginable number of interfering virtual particles swirl all around us from which the real ones only arise through observation, during which the corresponding wave functions collapse. However, when we stop looking, the real particles will disperse again in the multitude of virtual ones, and each of them will continue to follow its own probabilistic trajectory. The unobserved quantum micro-object is then again found in a coherent linear superposition of all possible undifferentiated states as concisely explained by John Gribbin: “Nothing is real unless we look at it, and it ceases to be real as soon as we stop looking.” (Gribbin 1984, 173)

In that case, let us work with the idea of a physical phenomenon that can take place in several ways and also our apparatus (in case both slits are open), where there is an electron gun firing one electron on one side and on the other side there is a detector in the form of a shield and do not observe. Then the probability that the electron will arrive at this or that place on the shield is given by the square of the sum of the relevant Ψ, where Ψ basically corresponds to the Schrödinger wave function. For two slits (as two ways in which the phenomenon can take place) we get the probability $P^{\sim}$ for which: $P^{\sim} = (\Psi + \Psi')^2$ and after expansion then: $P^{\sim} = \Psi^2 + (\Psi')^2 + 2\Psi\Psi'$. However, if we find out which slit the electron passed through, we reduce the phenomenon to one possible course of action; the electron is forced to choose its realized path through the first or second slit, the wave function collapses and we observe a real corpuscle. And the probability that we will find it somewhere on the shield is then reduced to P^*, for which the following applies: $P^* = \Psi^2 + (\Psi')^2$. We see that if a particle loses its superposition, we also lose the interference term $2\Psi\Psi'$ in the probabilities of its impacts, a kind of “added value” that the corpuscular “face” of the particle no longer has. If the particle is in a state of superposition, it is practically nowhere and everywhere at the same time. (Reichenbach 1971, 259)

Its corresponding cloud of virtual particles with all possible and non-excluded potential trajectories is well informed at every moment both about the set-up of our experiment and whether we are not observing. This “awareness” of the circumstances does not have to reach the superimposed particle in any way, moreover, it does not have to and (to preserve the superposition) such a particle must not interact with anything in order to obtain information. For such a cloud of virtual particles, all circumstances exhibit a kind of simultaneity summed up in the notion of “always knowing” pointing out that time is meaningless to a particle in a state of superposition. It is not fragmented into past or future, because all possibilities are potentially realized by virtual particles always and now. And so time in the case of such a particle does not even have a place where it would actually pass.

Nevertheless, the situation changes after the collapse of the wave function when from all the virtual particles representing the superimposed particle, only a real one “crystallizes” with its realized path, and such a path then certainly characterizes its real past. And if we continue to follow where this particle is moving, we will not know exactly where it is (Heisenberg’s uncertainty principle) but we will know where it is going and, therefore, we will be able to predict its future quite well. (Coveney, Highfield 1995, 128–129) After the collapse of the wave function, a real corpuscle will emerge from the “timeless” superimposed particle, for which time will already be strictly fragmented into well-known parts. Time will show us a “face” that contains the past, present and future.

Due to the loss of the interference term during the collapse of the wave function, the past-future time as we understand it will be just one special case out of many arising from an undifferentiated time continuum containing all probabilistically possible time alternatives that a given particle in the state of superposition possesses.

Our, or rather Newton's, idea that time passes regardless of things, independently of them and their changes, was already considerably modified by Einstein. In his relativistic theory, time flows at a different speed from the point of view of a given observer de facto in every place in the universe, it has its past and future and is physically real. We can consider that such an observer sees individual times "materialized" as if they "jumped out of the box" of the continuum at the last minute. If we relocate the observer, he will see a different situation though still a real one from a physical point of view. Somewhat different times will emerge from the continuum, partly fragmented but also totally real.

Carlo Rovelli comments on this as follows: "Between one appearance of the electron and another, it has no precise position as if it were dispersed in a cloud of probability. In the jargon of physicists, we say that it is in a "superposition" of positions. Spacetime is a physical object like an electron - it also fluctuates and can be in a "superposition" of different configurations. The illustration of stretched time […], for example - if we take quantum mechanics into account - should be imagined as a blurred superposition of different spacetimes, more or less as shown below." (Rovelli 2018, 78) And he adds: "Just as a particle may be diffused in space, the differences between past and future may fluctuate too: an event may be both before and after another one." (Rovelli 2018, 79)

Einstein once said that God does not play dice. Yes, Newton's god does not really play dice. All it takes is a single clock and the consistency with which he makes sure that it goes exactly right. The situation of Einstein's physics "god" is more complicated though. He has countless clocks in charge and must constantly check that they are all operating at the right speed and also in a way they are to all the observers. How about a quantum mechanical god? In most essays on quantum mechanics, we read that he operates some kind of dice game. But is it really true? His game rather reminds us of a kind of hazy roulette wheel, on the circumference of which myriads of boxes and numbers swirl which alternate in leaps and bounds with such speed that we do not even know where anything is. However, what is essential to the game is missing here, the ball is missing but if we focus our attention on where the ball is, we will obviously find it. It will be in one of the boxes and it will also have a number but we are not aware of where and how it actually got there. But at the same time, the roulette with the fog and everything else will disappear somewhere. So, what kind of game is it? It seems that we are actually playing it ourselves. Of course, god will pull some random number box out of his imaginary sleeve for us but that is only because we are wondering where the ball is. Probably, if it were not for us, God himself will not play any dice. However, let us return to the main question of this paper, i.e., whether it is possible to equate duration with a quantum space-time continuum and thus ensure support for Bergson's concept.

Bergson's Duration vs. Space-Time Continuum

From the above, it is clear that time from the point of view of quantum mechanics can be divided into time that is difficult to define and, in the physical sense, real time which is fragmented into the past, present and future. Bergson divides time in a similar way within his concept. According to him, duration in the form of continuous flow can only be known in the form of experience, through intuition connected to the fundamental self. However, the experience gained in this way is indescribable and incommunicable, and above all, also unverifiable, if the person in question does not experience it himself.

If we include the intellect associated with the so-called superficial self in our cognition in order to mediate the acquired experience, the continuum in the form of duration disappears and well-known, homogenous time presented in terms of Bergson's concept appears. Thus, as we know, Bergson does not consider this to be real as he considers only duration to be real.

If we draw a parallel between Bergson's duration and the quantum space-time continuum (in which the superimposed particle is located), we will not find any direct correspondence. Duration is an indivisible continuous flow from the past to the future. And even though the past and the present are indistinguishable from each other, the future is completely open because duration brings something new all the time. While the quantum-perceived continuum is not divided into individual time segments at all since all possibilities are realized in a state of superposition always and now. Within the duration, however, one of the possibilities is already being realized, even if we do not know in advance what exactly it will be, gradually, as the duration unfolds.

So, the unanswered question is what is the time that Bergson describes? If we focus on his concept in its complexity, it seems as if he was trying all along to create objective time from subjective time, one that corresponds to reality itself. At the same time, however, he was unable to completely abandon certain subjectivism, whereby its duration takes the form of something that stands somewhere between the quantum continuum and homogeneous time. Furthermore, Bergson himself somewhat contradicts himself when defining the concept of duration. On the one hand, he claims that duration cannot be grasped by the intellect (superficial self), but on the other hand, he tries to do so vehemently when describing it, thereby introducing into duration, albeit perhaps unconsciously some attributes of homogeneous time. The effort to describe duration by the intellect then appears to be counterproductive, as it brings duration closer to homogeneous time rather than moving it to the mentioned continuum. We can only wonder what it is that motivates Bergson to such efforts. Perhaps in the end, despite all his efforts, he failed to identify his fundamental self with duration in an authentic personal experience, for if he did, such an experience would be so different from anything he had ever experienced that any intellectual construction to describe it would lose all meaning. However, this is pure speculation on my part.

Conclusion

Nevertheless, Bergson, in his research on time or matter, based only on immediate experience, which is based on the perception and intuition of the given subject, managed to a certain extent to foreshadow several fundamental quantum ideas. Therefore, originality cannot be denied to him, because he believes that, while trying to describe reality, he is assuming or attempting to cross the boundaries of his own subjectivity. Therefore, if we focus specifically on his description of duration purely from the point of view of subjective perception, this description seems to be quite accurate, but his attempt at objectification was not entirely successful, which was shown by a direct confrontation with quantum theory.

Bergson was adamant that his (partly subjective) concept represented reality as such. And this is perhaps the biggest pitfall of Bergson's philosophy. I believe that physics is somewhat more modest in this respect. It is aware that it only creates models, more or less close to reality. Whether it is, for example, Bohr's model of the atom based on the postulate, or a cloud of virtual particles attributed to parts in superposition. However, physics fully reflects its limits, it does not consider the best models to be truly real, and it does not have the slightest difficulty in declaring that no one knows where the superimposed part is located.

However, even though quantum theory did not support the idea of the existence of duration, and even though Bergson's philosophy of time is somewhat controversial in its complexity, some partial ideas of Bergson still seem to deserve our attention.

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