ON THE UNIFICATION OF THE REAL SCIENCES. APPROACH A: ON THE RELEVANCE OF ACTUAL PHYSICAL FACTS[1]

W. W. Kofler

International Academy of Science (Health and Ecology), Innsbruck, Austria

ОБ УНИФИКАЦИИ РЕАЛЬНЫХ НАУК. ПОДХОД А: О ВАЖНОСТИ РЕАЛЬНЫХ ФИЗИЧЕСКИХ ФАКТОВ

В. В. Кофлер

Международная академия наук (Здоровье и Экология), Инсбрук, Австрия

The proof of non-local efficacy enables the second quantum revolution. This was recognized by the Nobel Prize to Clauser, Aspect and Zeilinger, but did not settle the Einstein—Bohr debate. Bohr's world view was not the subject of the investigations. What was actually confirmed was Schrödinger's prediction that, contrary to Einstein's position, nonlocal effects are characteristic of all quantum processes. Einstein's research approach served two goals: 1) To solve the epistemological problems resulting from the refutation of the seven-day creation by the theory of evolution. 2) To unify all theories of natural events. Einstein's epistemological principles allow to assume as real only that what is empirically secure. For nonlocality empirical findings were presented only after Einstein's death. They are considered as secured by the award of the Nobel Prize. Thus, Einstein would have to take them into account today. Therefore it makes sense to take up Larsson's suggestion and reactivate the discussion on the nature of nature, its explorability and the unification of theories. The quantum theories and general relativity are indispensable, but so far incompatible. Changes in their mathematical variables are considered incompatible or unnecessary. Therefore, the hope is justified to reach unification by changing only the world view in order to make the identical empirical facts understandable. In this respect also unnoticed physical positions are used, esp. (a) the one of Heisenberg 1955, according to which quantum objects are assigned potentia in the sense of Aristotle, (b) the energetic field (Einstein 1905) not only as a formulaically relevant quantity, but as a precursor of the electromagnetic fields as well as (c) findings of the obviously evolutionary oriented cosmology. Nevertheless, crucial questions like the involvement in the evolutionary process remain open. Approach B tries to close these gaps.

Keywords: Einstein, Bohr, Larsson, Zeilinger, causality heuristic, entanglement, nonlocality extended world view, cosmic evolution, sustainability, health

Доказательство эффективности феномена нелокальности позволило совершить вторую квантовую революцию. Это было отмечено присуждением Нобелевской премии Клаузеру, Аспекту и Цайлингеру, однако не разрешило спор между Эйнштейном и Бором. Мировоззрение Бора не было предметом исследований. Фактически было подтверждено предсказание Шредингера о том, что, вопреки позиции Эйнштейна, нелокальные эффекты характерны для всех квантовых процессов. Исследовательский подход Эйнштейна преследовал две цели: 1) решить эпистемологические проблемы, возникшие в результате опровержения семидневного творения теорией эволюции. 2) унифицировать все теории природных явлений. Эпистемологические принципы Эйнштейна позволяют считать реальным только то, что эмпирически обеспечено. Для нелокальности эмпирические результаты были представлены только после смерти Эйнштейна. Они считаются доказанными присуждением Нобелевской премии. Таким образом, Эйнштейн должен был бы учитывать их и сегодня. Поэтому имеет смысл воспользоваться предложением М. Ларссона и возобновить дискуссию о природе, возможности ее исследования и объединения теорий. Квантовые теории и общая теория относительности являются необходимыми, но пока несовместимыми. Изменения их математических переменных считаются несовместимыми или ненужными. Поэтому оправдана надежда достичь объединения путем изменения только мировоззрения, чтобы сделать понятными идентичные эмпирические факты. В этом отношении используются и незамеченные физические положения, в частности: а) положение Гейзенберга 1955 г., согласно которому квантовые объекты наделяются потенцией в смысле Аристотеля и б) положение об энергетическом поле (Эйнштейн 1905 г.) не только как формульно релевантной величине, но и как предшественнике электромагнитных полей, а также в) выводы явно эволюционно ориентированной космологии. Тем не менее, такие важные вопросы, как участие в эволюционном процессе, остаются открытыми. Вторая часть этой работы (подход В) пытается «закрыть» эти пробелы.

Ключевые слова: Эйнштейн, Бор, Ларссон, Цайлингер, эвристика причинности, запутанность, нелокальность, расширенная картина мира, космическая эволюция, устойчивость, здоровье

Introduction

Has Bohr's worldview been confirmed?

The award of the Nobel Prize in Physics 2022 could easily be understood as a confirmation of Bohr's worldview and a falsification of Einstein's worldview. The basis of the now awarded work is, after all, the preliminary work of Bell and Clauser from the 1960s. Bell and Clauser held the opinion that they could decide the Einstein-Bohr debate experimentally. Their approach,

[1] Dedicated to Prof. Dr. Matt Larsson, Department of Physics, Stockholm University.

however, does not address the crucial but not overtly addressed question for Einstein and Bohr of why one can successfully make predictions even though the rationale for the laws of nature had been lost along with the acceptance of seven-day creation. Their approaches also do not allow one to distinguish whether the quantum world is real even when no one is observing it, which is what Einstein assumed, or whether Bohr's position is correct that only the macro world is permanently real, but the quantum world is real only for the duration of observation. Bohr's worldview was found to be unverified. The 2022 awarded studies also does not answer the question whether it is sufficient for real science to know — as Bohr assumes — the way to reach a certain result, or whether one should strive for a causal reasoning to make insightful why an event occurs, which Einstein assumed. Also the usefulness of the method developed by Einstein, how one can come progressively to the expansion of the knowledge and the world view with limited knowledge, was not examined. Therefore it is open why Einstein can to his position in 1935 and whether or how this would have to be changed with more advanced knowledge when applying Einstein's methodology. These questions are still relevant and unanswered today. Therefore it is commendable when Larsson in the laudation [19] with his remark that Zeilinger had closed the circle to Schrödinger with his work oriented to the application in everyday life, motivates to take up these fundamental questions again.

Empirically based statements presuppose that it is made clear what is measurement and the domain of reality. Schrödinger did both in response to Einstein's EPR paper in 1935 [8, 25]. Thus he is in contradiction to the position of Bohr. The latter assumed differences in essence between the micro world of quanta and the macro world. For Schrödinger as for Einstein, however, the quantum world was a part of the real world. About this one can get knowledge by measurements without the scientific observer having any influence on it other than by the choice of the experimental arrangement. Therefore, the researcher who opens the box in which «Schrödinger's cat» is trapped, does not cause whether the cat dies or lives. He can only make the finding whether it has already been killed by the poison or, in the absence of radioactive decay, the lethal machinery has not been triggered. Bohr and his followers assume that the observer triggers the effect[2]. That is why Bohr called Schrödinger a high traitor in 1936 [26].

The Confirmation of the Position of Schrödinger

Answered by the now excellent work, the predictions Schrödinger made in response to the EPR paper [8] on the nature of quantum processes have been empirically proven. [The EPR paper and the various reactions that this publication provoked are discussed in more detail in the Supplement. Schrödinger, in the landmark 1935 paper that was unfortunately translated into English only in the 1980s, predicted that entanglement is THE characteristic of quantum processes, with the resulting processes being nonlocal, i. e., proceeding at superluminal speeds [25]. With this proposal he met with no resistance at Einstein, because Schrödinger put only a logical conclusion about the reality for discussion, but probably when it was claimed that this nonlocality is expression of the real processes running in the nature. These would be then spooky remote effects, Einstein said [9]. The empirical proofs were missing. But if, as it has been proved now, the nonlocal effects are the essence of the quantum processes, then this has more far-reaching consequences than that one can encode messages with the concretely applied special case of the application of entanglement, as significant as this is. One more reason to take up Larsson's suggestion.

Einstein's Approach to Unification

Einstein clearly distinguished between the speculations, which are permissible and necessary in science, how processes in nature could take place, and the assertion that nature would be like that. This results from Einstein's world view and his technique, thanks to which one could continue to make causal statements with the help of so-called principle theories, despite the abandonment of the seven-day creation. [Supplement] Thereby it makes sense to adjust the world view, from which the principles are derived, consistently with the in the meantime won empirically secured facts. Otherwise there is the danger that philosophy or mathematics dominates over empiricism. Therefore Einstein has consistently adjusted his world view. His aim and, in his opinion, the highest aim of physics as a whole was [5] to discover the foundations from which the order in nature can be deduced to the understanding of everyday life today. This could be achieved, he said, by consistently simplifying theories until one arrived at the «mother of all theories.» The assumption that one can trace back different theories, which are irreplaceable for partial aspects, to common precursors would be nonsensical, if one assumes like Newton that the regularities were created side by side and simultaneously. Einstein's approach is thus implicitly based on the assumption that there is a single evolutionary process.

Until shortly before his death, which he expected in the near future because of his aortic aneurism (whose operation he refused), he was of the opinion that he would be able to transform the heuristic° general theory of relativity into a «complete theory°». Here «completeness» included not only that all mathematically necessary variables had been taken into account, but also that all quantities had been derived from the principles. In his last lecture he admitted that he had not succeeded in this. Therefore, the GTR, like the quantum theory, which he

[2] The article is not only aimed at physicists. It draws on numerous scientific disciplines. Therefore, it cannot be assumed that every reader knows every technical term. Therefore, various terms are brought to mind in the supplement. These terms are marked with the symbol °.

considered mathematically irreplaceable, is operationally irreplaceable until today, but it is not the «theory of principles» he was looking for [27]".

The Extended View — a second approach

There is a second approach to make previously irreconcilable but irreplaceable theories interconnectable. This is the «Extended View» advocated by Kofler et al [16]. It too assumes a single non-predetermined evolutionary process. Their aim is to create a common «framework paradigm» for the scientific approaches that have so far been incompatible at the causal level, but which are indispensable for a comprehensive understanding of health and sustainability, into which the paradigms of the individual disciplines can be integrated like subsets in a common basic set. This preserves the validity of the initial theories. Thus, their strength does not lie in the fact that problems, which could already be solved adequately are answered better. The Special Theory of Relativity, which made the quantum theories possible without replacing the theories of mechanics and electromagnetism, proves that the real power is that questions, which could not be formulated before, can be asked and questions, which seemed to be unanswerable before, can be answered.

Preliminary Situation

In the meantime, the initial situation has changed considerably since Einstein's death: On the one hand, further insights have been gained in cosmology and quantum physics that Einstein could no longer take into account. Approach A uses Einstein's technique and takes these findings into account, in particular also the fact that Schrödinger's characterization of all quantum processes by entanglement was confirmed by the Nobel Prize 2022. Approach B exploits the propositional capabilities of the «Extended View». Thus, two approaches are available which have in common to assume a single evolutionary process. Einstein chose the approach to use the mathematical formulas for the early universe in the expectation of being able to calculate the evolutionary development up to the present state. The «Extended View» starts from today's state and derives from it which characteristics («principles») the actors would have to have had at the Big Bang, so that by their modification today's state becomes comprehensible on a causal level.

The elephant in the room.

Scientists tend to justify their activities and the positions of other researchers exclusively with science-related arguments. This is not scientifically tenable. Th. Kuhn has demonstrated that the decision in favor of this or that scientific position depends primarily on whether self-related interests are thereby questioned or supported. Therefore, the success or failure of scientific revolutions is not determined by which paradigm is more powerful, but by who can assert his interests more successfully [18]. Max Planck has put forward another argument. He means «Man does not only want knowledge and power, he wants a worldview which guarantees him the highest good on earth, the inner peace of mind» [23].

The dispute between Einstein and Bohr had a decisive influence on the scientific discussion. It determined the activity of Bell and Clauser. Both were anxious to make causal statements about it on empirical way. Clauser even changed his profession because of them. The reason was the reference to the incompatibility of his desire with a philosophical position, which «no decent experimental physicist» would question. Without a change of profession, the studies appreciated in 2022 should not have been carried out at all [2]. Without a comprehensive understanding of why which arguments may be advanced and others not, misconceptions of the historical as well as the present situation would be expected. Therefore, these will be briefly discussed.

In addition to the specific individual reasons, there are general challenges to scientists that everyone knows must be considered, but people do not talk about them out of self-protection. The term «the elephant in the room» is used for this. Depending on the scientific and social environment, there may be different reasons why it is better not to talk about obvious problems or interests. For the «younger physicists» the career-defining «elephant in the room» was not to go against the prevailing paradigm. They complied by adopting Bohr's worldview.

For the «older generation», i.e. especially Bohr, Einstein and Schrödinger, but also de Broglie, Planck and Born, these were the consequences of the acceptance that the objects of nature and with them the principles of order in nature could not have been created in seven days.

What was and is the fundamental problem here?

The facts presented by Darwin did not only exclude that all creatures could have been created in 7×24 hours, or in 10,080 minutes or 604,800 seconds. This can be easily seen. The fact that the species have changed in the course of the time itself is already more difficult to accept. But the real challenge results from the fact that with the belief in the seven — day creation also the former reason for the order and the alignment of the processes falls away. In this phase, according to Newton, God as the physical first mover had not only given the processes the inevitable orientation, but also laid down the principles of how interactions proceed and in which logical relationship terms, numbers etc. stand. If all this would be omitted and only their physical energy would remain to the objects, nothing can be explained any more. Then it turns out that energy is only the means with whose help e.g. the human being can move himself and other objects, but without empowerment for alignment. A world view only on the basis of physical energy is missing therefore the really decisive, so that purposeful, meaningful and explorable happening is possible. This presupposes that one can observe and thereby make differences, assign a meaning to these and if necessary change them again, choose a goal, weigh between options and then

decide to use his energy in such a way, differently or not at all. But one cannot refer to these abilities and efficacies any more, after the seven-day act of creation together with the achievement of the physical first mover had to be given up. Without these capabilities and specifications the world must appear absurd to the logically thinking researcher.

Understandable that for Heisenberg in 1955 the absurdity disappeared when he was ready to grant dynamis / potentia in the sense of Aristotle to the quantum objects. The dynamis covers, after all, all spheres of action. Dynamis/ Potentia was not used by Heisenberg in an operational way, but only to make heuristic processes understandable. For the «Extended View» the effects it covers had to be differentiated accordingly and made operational. One area is usually covered by «energy». Therefore, a second term is needed that covers the «rest» on the same level. For this purpose the term «discrimination» was chosen. The semantic problem is that neither «energy» nor «discrimination» is the name of something that physically exists, but a sum term to express the usability of a capability for different kinds of uses with one word. After all, energy cannot be bought, but only e.g. gasoline, thanks to whose properties one can move a car. This will be discussed in more detail in approach B.

But without dynamis and without the physical first mover the comfortable starting situation of the past centuries was over: At that time everybody accepted e.g. the laws of nature as expression of the divine will. One could discover them and then apply them to all individual cases. Deviations of the observed phenomena from the prediction were an expression of the fact that not all laws of nature have been discovered yet. Now one would even have to explain why the researcher, who is as a primate himself a part of this nature, is able to think about it and so much better than all other persons that one establishes universities with professorships etc. for them. An employment and appointment is probably only justified if one further accepts the explanation of the powerful ones or at least keeps open that there was the seven-day creation after all.

Einstein's solution approach

Just for Einstein, who was actually a lateral entrant as an official of the patent office, it was particularly risky in 1905 because of the current events in Europe 1904–1905 to speak out for the theory of evolution. He skillfully avoided this, relying on the thought world of Baruch Spinoza and devising a technique for continuing to use established procedures: He saw the primacy of science as contributing to making it easier to find one's way in the world. Therefore, it would be irresponsible to abandon a proven technique because its philosophical justification is under attack. One would have to strive to find a scientifically correct solution for each of these applications, but until then continue to use the technique. In the place of the directly intervening God or other scientifically not comprehensible causers step by step the more and more efficient natural objects step as causers. The natural scientist does not need to answer the question, where the natural objects have these abilities from: The aim of the real sciences is only to make the appeared phenomena logically comprehensible and not to deduce the essence of its explanation. No science can derive its own foundations from itself (Gödel). Thus, the question of the origin and properties of the initial agents is outside the purview of the natural sciences.

For his activity, the researcher must make assumptions about the world. In this respect, too, Einstein in 1905 anticipated the development of another discipline, that of modern linguistics [F. d. Saussure 1916, 24]: He recognized that every word, symbol, number, and therefore also the formulas, laws of nature, etc. derived from them, are only free inventions of the human mind. They are therefore of a different nature than the objects and processes for which the formulas etc. stand. Formulas therefore do not themselves affect anything, but are therefore helpful because they successfully express what the objects effect in nature. However, inventions are not free like the script of a movie about Schrödinger's cat or the contents of «Harry Potter». Scientific inventions must be compatible with observational facts. The inventing is the scientific-theoretical-ontic assumptions is one part of the natural research, the empirical investigation is the second. Both are inevitably connected with each other. The theory determines what one can observe (Einstein), what one cannot observe (Heisenberg), but also which conclusions one has to draw from the phenomena and how one has to formulate them, in order to be counted further to a certain scientific community. Einstein makes clear: empiricism must have priority over epistemology, mathematics, geometry, etc°.

Einstein also created the conditions for Popper's «logic of science». Popper, too, recommends continuing to use the challenged but proven technique until the scientific community recognizes an alternative as the new state of the art. This would have to be done empirically, trying to falsify alternatives unsuccessfully until the community considers further falsification studies a waste of resources. Or by an experimentum crucis, as in the case of Eddington's 1919 study, which was to test whether the deflection of a beam of light as it passes the sun is bent according to Newton's formula or that of Einstein. Einstein's prediction was confirmed and thus Einstein became a media star. But Einstein contradicted Popper, who demanded that the formulas of Newton and Maxwell were therefore falsified and must not be used any more. Einstein justified this with the negligible gain in accuracy and the disproportionately high amount of work involved in using special relativity. This is essential not only from a practical point of view, but especially with respect to its statement about the nature of the evolutionary process. The evolutionary new is indeed only a novel, very special application of already before given very many possibilities. These are not lost with the decision for the novel use. But the other possibilities of use are used in practice in

the future so extremely rarely that one can neglect them. Of course, the premise of Special Relativity is true, that all quantum objects and their descendants can observe the environment in terms of their own nature and choose their orientation so that they choose their path with the least expenditure of their own resources. Newton's assumption, light rays would be forced by the laws of nature according to the forces emanating from the sun to move according to the geodesic, is therefore wrong. But the error is so small, that one could say calmly, they move in such a way «as if there would be the gravity» and «machine-like forced processes». As long as the problems at hand are within the evolutionary range of the properties of a basic actor (in this case the atom or the electromagnetic field), one can neglect the influences on their predictions. This fits to the success of the sectoral disciplines based on the theories valid for the evolutionary domain of their objects of research. The strength of unification thus lies in being able to make cross-disciplinary statements and ask questions that could not even be formulated before.

Bohr's approaches

Bohr used three mutually exclusive scientific-theoretical approaches to the world. His pioneering research on the atom, which won him the Nobel Prize in 1922, and on the periodic table assume a single real existing world. In 1924, together with Kramer and Slatter, he published a paper that sought to falsify Einstein's work, which had been honored with the 1921 Nobel Prize [1]. In this paper it was proposed, on the one hand, to understand the conservation of energy only as a probability quantity. This was empirically refuted. Not refuted was Bohr's second initial assumption: he assigned potentia to quantum objects in the sense of Aristotle. This was incompatible with Einstein's then radical determinism. Bohr discarded both initial assumptions. But this proves: Niels Bohr had recognized the scope of the fundamental problem in 1924 and had also come up with its solution. He rejected it. Neither he nor his followers — apart from Heisenberg after 1955 — have taken up this idea until today. For Einstein — not surprisingly for a professed follower of the religion view of Baruch Spinoza — this approach was still «unbearable» in 1924. He would rather be «a cobbler or better an employee of a gambling house than a physicist» before he had to assume «that an electron exposed to a beam chooses by free decision the moment and the direction in which it wants to jump away» [6].

There were several proposals for the solution of this «elephant in the room» (Supplement). Bohr finally agreed with the proposal of the physiologist Emil du Bois Reymond. The latter had derived seven world riddles from the nature of the brain and Kant's philosophy, which man was fundamentally incapable of solving. Ignorabimus — we don't know it and will never know it, where the free will, the sensations, the life, the order in the nature, matter and forces etc. come from [4]. Therefore, only more heuristic research can be done in these areas. Thus, there can be no complete theory in the sense of Einstein. Why Bohr nevertheless developed a world view, according to which the quantum theory is «complete», is just as difficult to understand for the author as the purely philosophical assumption, according to which the micro-world in its essence is supposed to be different from the macro-world, but the observer can temporarily impart classical physical properties to the quantum objects for the duration of the observation. For the phase between the observations there can be no empirical statements and therefore no formulas concerning them, as Dirac explained [3]".

On the tension between empiricism and theory

Thus, in principle, questions concerning the mutual dependence of empiricism and theory become important, especially because the unification of the real sciences presupposes that the corresponding world view can be accepted by every scientific discipline. However, each discipline has its own special requirements. Therefore all disciplines are equally responsible to make their demands on and their contribution to this common world view. However, each discipline orients its methods to its own questions, which are therefore different from those of the other disciplines. Therefore, the common responsibility for unification ends at the creation of the common world-view and the formulation of the common principles. It cannot concern the empirical proving. Therefore, the related discussion from a special position must be conducted in such a way that changes lead only to a generalizable interpretation of already existing data. For a necessary new study only one specific discipline would be responsible. Their results would have to be checked for compatibility with the claims of all other disciplines.

The upcoming situation proves to be a special stroke of luck in this respect: The work of the Nobel laureates for Physics 2022 proves that entanglement is not compatible with a mathematical extension of the formulae. The situation concerning General Relativity is similar. It has proved itself in cosmology until today, although the cosmos, from which Einstein started, included only 5% of the energy carriers, which are considered as secured in the meantime. Therefore, also for the ART no formulaic change is needed and therefore also no additional empirical studies, if it is only about the world view.

On the dynamics of Einstein's positions.

Einstein consistently adhered to the principles he himself had established, according to which changes in the world view must be made as soon as new phenomena are sufficiently certain, but not earlier. In 1922 Friedmann presented calculations according to which Einstein's equations allow for different types of a processual universe: one that is expanding, one that is contracting, and one that — thanks to lambda — remains unchanged. Einstein confirmed the mathematical correctness, but continued to insist on his ideally determined static model. After all, there was no new empirical evidence. Lemaitre derived mathematically the Big Bang in 1927.

Only when the findings of the escape movement of the galaxies, presented by Hubble in 1929, found recognition all around, Einstein decided in 1931 to specify the world view accordingly. There were several mathematically correct solutions, even one with the Big Bang. He gave up the radical determinism: Therefore he demands only «As simple as possible but not simpler»(however without specifying what would be «too simple». This succeeds with the Comprehensive Simplicity° He recognized the Big Bang and Hubble's position. He deleted the cosmological constant, which was no longer necessary (in the meantime it became a hot candidate for the mathematical consideration of the dark energy). Einstein even went so far as to present a model of a pulsating universe himself [13].

Regardless of what he accepted as certain as a characteristic of the real world, Einstein dealt intensively with his own and others' speculative possibilities of thought. He wrote to Max Born in 1944: «You believe in God who throws dice, and I in an order in a world which exists objectively and which I try to grasp in a wildly speculative way, ... — but I hope that someone will discover a more realistic way, or rather a more tangible basis, than it has been my lot to find» [9]. This also concerns one's own determinism. Thus, Wolfgang Pauli reports to Max Born that Einstein told him emphatically and often over the years that Einstein's starting point was realistic and not deterministic [22].

His analyses later also led him to the conclusion that «it is not possible to eliminate the statistical character of the present quantum theory by merely adding to it» [14]. The quantum theory, which he called «the most successful physical theory of our time [11], ... the only present theory which permits to grasp uniformly the experiences about the quantum character of the micromechanical processes» [12], was therefore «complete» with respect to its mathematics and compatible with no unknown variables. In 1935 he had left «unknown variable» still open as an option. This was not known to Bell and Clauser, thanks God. Otherwise they would probably not have pursued their considerations, which were irreplaceable for the 2nd quantum revolution, so consistently.

Relevance of gains since Einstein's death.

This position, now honored with the Nobel Prize, is not the only empirically proven finding on the nature of the physical world, which after Einstein's death an adjustment of the world view, which Einstein represented, becomes necessary, if Einstein's technique is taken into account, in order to consistently extend the state of knowledge in an empirical-logical way.

«Heisenberg 1955» ties the Aristotelian potentia into the Copenhagen interpretation.

In a series of lectures in the winter semester 1954/55, Heisenberg solved what he considered to be the depressing problem that the quantum world is illogical when viewed from Bohr's point of view of the Copenhagen interpretation°. For this purpose he took up Bohr's proposal of 1924 and granted to the quantum objects dynamis/lat. potentia in the sense of Aristotle [15]°.

The dynamis enables to be able to move oneself in the geometrical space, but also to observe, to assign meaning («information») to what is observed and to be able to draw conclusions about the use of one's own dynamis by evaluating it: To act physically or meaningfully or to refrain from doing so and to endure. The dynamis creates future capability and thus also the orientation towards novel effectiveness, but this only on the basis of the modification of what has already been achieved. The lowest level of potentia in the stage structure has the inanimate objects. Therefore, inanimate actors cannot recognize or cause life expressions according to their nature, but only processes on their own evolutionary level.

Conclusions for quantum processes

Heisenberg modified the Copenhagen interpretation by assigning dynamis to quantum objects. This has far-reaching consequences, as pointed out by Northrop in 1956 [21].

1) In the world of Aristotle — and therefore also of Heisenberg — thus the energetically related conservation laws must have their correspondence also in the area of the assignment of meaning and discrimination ability.

2) There are only single processes. Mean values and therefore also normal values etc. are inventions of scientists, which need justification.

3) Heisenberg assumes that also quantum objects are observers. On quantum levels, therefore, quanta can mutually observe each other. Then the effect possibilities should be expected, which arise from the «inside view». This is comparable to the situation of a correctly conducted psychosocial scientific study, in which the researcher «like a wall-observer°» is not noticed by the research objects — in psychosocial research persons. Heisenberg does not use this approach. He continues to work only heuristically.

4) Thus it became clear for Heisenberg why the result of the individual case cannot be predicted, but it becomes conceivable that nevertheless a common and therefore predictable goal is aimed at. Thus quantum physics lost its absurdity for Heisenberg.

5) Northrop refers to the importance of the involvement of potentia also on e.g. social areas, which are only indirectly physically influenced.

6) This work of Heisenberg has appeared in many languages and high editions. It is quoted again and again, but very selectively — i.e. omitting the passages concerning Potentia — although Heisenberg held on to this position until his death.

Additional empirically secured knowledge for physical processes.

Since Einstein's death in April 1954, the state of knowledge in the sub-disciplines of physics that Einstein had intensively considered, namely cosmology and quantum physics, was considerably extended. In this paper only these empirically founded facts were taken into

account, which can be used unchanged in order to interpret them anew in the light of a modified world view. This concerns on the one hand the work honored with the Nobel Prize. This also applies to the following extensions of knowledge and questions arising from it to the world view overlapping disciplines:

1) Approximately since 1977 (Weinberg S: The first three minutes) evolutionary cosmological models are available, which are all based on the General Relativity.

2) The models start from the Big Bang, where the evolutionary fundamental physical objects moved away with their maximum possible local velocity. The initial assumption is the electromagnetic field with its quantum and thus the speed of light as the maximum possible spatial effectiveness. Electromagnetic fields are considered as continuum. How does it become conceivable that the unimaginably small area requirement for all energy carriers of the universe assumed at the Big Bang is compatible with a potential continuum nature of the electromagnetic field?

3) The cosmological models assume an extent of the space occupied by the cosmological objects, which is about 1050 times as large as it can be reached with speed of light as maximum space effectiveness. Therefore an inflationary phase is assumed. The necessary expansive effectiveness corresponds thereby to the expansion of the diameter of the DNA to about 100 million light years.

4) Starobinsky, Guth and Linde (1978–82) could offer mathematical solutions, in which it is assumed that the space between the electromagnetic fields moving further only with light velocity was expanded in unimaginably short time duration, that afterwards the light velocity as maximum space effectiveness could take the evolution course empirically secured after this phase. How can this be reconciled e.g. with the law of conservation of energy, since de facto the electromagnetic fields changed their position with the inflationary space effectiveness and are on the way afterwards only with their own speed. How is this compatible with the principles of the SRT? According to this, there is no passive motion in the quantum world. But Einstein's primacy of using empirically proven theories allows the temporary acceptance of such challenges.

5) Since 1998 (Turner; Dark Energy) or at any rate since 2014 (Lambda — CDM model as standard model also with Dark Matter) it is considered as certain that the Light Matter and the rays, which Einstein assumed as the only energy carriers in his cosmological models, account for only about 5% of the total energy of the universe. Nevertheless, the General Theory of Relativity, developed in 1915, still proves itself with the highest accuracy for cosmology-related projects. Obviously, the energy defined on the basis of the energetic field has always sufficiently considered the total energy. Thus, the energetic field does not enter the representation of real processes only as a mathematical auxiliary construction, as Einstein presented in 1905 for lack of empirical confirmation, but part of reality.

6) All cosmological models exclude that the human being has taken an influence on the cosmic evolution by his observing and measuring.

7) In 2022, the Nobel Prize in Physics was awarded to Clauser, Aspect, and Zeilinger for their research and development of the utility of entanglement. According to this, entangled particles show both local and nonlocal efficiencies. According to Schrödinger, the nonlocal effects are considered to be the effects characteristic of quantum objects, regardless of whether they are also used practically, e. g., for encoding messages.

Application

Considered positions of physicists.

These positions founded empirically by physicists were integrated in the following sense into the thus further differentiated model of a world view:

(1) Schrödinger's position on nonlocality presupposes a wide-ranging concern with superluminal velocity. The challenges arising from this have not been addressed so far, except for the work awarded the Nobel Prize in 2022 and related work.

(2) Neither the reasoning of Newton nor that of Spinoza can make the fact of the order of nature and thus also e.g. the so-called «laws of nature» understandable. Their justification is still pending today.

(3) The primary task of the real sciences in the sense of Einstein is assumed to be to contribute to the fact that one can better find one's way in everyday life. Therefore, the demand for philosophical correctness cannot be followed, if thereby avoidable disadvantages would be to be expected in practice.

a. Therefore, possibilities for irreplaceable predictions are applied «as if» they were caused by extra-scientific influences until they can be replaced by natural or real scientific theories.
b. Einstein's position is extended that it is the task of the community of all real scientists to strive for a deductive derivation of principles which are not justifiable but helpful assumptions
c. The technique developed by Einstein for principle theories is suitable for this purpose.

(4) A single evolutionary process is assumed («From the Big Bang to the Big Mac»). Since extra-scientific influences must be excluded by definition in the end (no miracles, no intelligent design, no interaction between influences, which are fundamentally different by their nature), the evolutionary gains also in quantum physics can only have been caused by those, which were present in the respective previous state.

(5) Since also the approach of Spinoza is to be rejected, the reason is missing, why Einstein was allowed to impute to the quantum objects active and purposeful orientation of their movement, without introducing an enabling in addition to their energeticity, thanks to which also their individual and purposeful orientation can be

explained. After all, Einstein rightly demands that in a complete theory every element of physical reality must have a counterpart [8].

a. This enabling must be only one of two aspects of a characteristic of an actor, the other aspect of which must be its discrimination (ability). This Janus-headed linkage must be demanded, so that incompatibilities cannot occur, like the one with Descartes assumption of a substance dualism: He had to assume that God with his omnipotence links res extensa and res cogitans in the pineal gland of man.
b. For application-oriented, e.g. medical research, it is not enough that the necessity of this empowerment logically compellingly results from empirical findings. The usefulness of its postulation must also be corroborated by proving it in a study, extending the current state of knowledge. Kofler has provided this empirical evidence [e.g., Kofler et al., 17] and has referred to enablement as discriminability. This contribution was awarded the Thomas Kuhn Hope for the Future for a Sustainable World by Nobel Laureate Yuan Tse Lee. This is discussed in more detail in Part B.

(6) The success of General Relativity for predictions of energetic processes of our objects and the observable cosmic objects in a universe containing 20 times more energy potential than the one Einstein started from, suggests to understand the energetic field not only as a valuable mathematical auxiliary construction invented by Einstein, but as the discovery of the precursor of the electromagnetic field, which imparts the potential E=mcI to the electromagnetic field in the course of the evolutionary process. The electromagnetic initial actors, which lead to the Light Matter and the radiations, must also have a discrimination-related potential (Most Basic Actor).

(7) If one assumes this, the world view for the very first phase of the very early universe in the standard model of cosmology would change. The starting point is then no longer a « Ur-Electromagnetic field « but a physical actor whose energetic aspect is covered by the energetic field.

a. Its energetic field must make the nonlocal effects of the quantum objects in the sense of Schrödinger insightful and compatible with the empirical findings of the universe. Therefore, it is assumed to have inflationary spatial efficacy.
b. The conservation principle is also assumed for these processes.
c. The physical agent imputed at the time of the big bang with its not yet modified characteristics is called «mechanoeiton»°.

(8) Einstein, Aristotle as well as the Extended View and the Copenhagen interpretation (principle of indeterminacy) assume that only single cases occur.

a. Mean values, «normal values» etc. are therefore only mathematical auxiliary constructions.
b. If one wants to be able to deduce physical processes from individual evaluations in a generalizing way, one must resort to an auxiliary construction. One has to assume a similar goal for each individual actor, which, however, each tries to achieve in a unique way.
c. Therefore, the notion of «symbolic intention°» was introduced. Assumed as a generalizable individual goal is what is usually caused as an observable effect. Therefore, the objects of the micro-world are assumed to have the symbolic intention to be able to align themselves individually as creatively as possible but in so far in consensus that this is done without colliding with the objects of the environment.

(9) The reasoning of Dirac seems conclusive that Bohr's assumption does not lead to any empirically justified statements, according to which between the phases accessible to the empirical researcher by the measurement it comes to a loss of physical characteristics and the next observation would cause the realization according to the reality of the macro world. What has happened in this period is unknown to the empirically oriented researcher. Schrödinger assumes that by the measurement becomes representable, which of the numerous theoretically given possibilities the interaction between measuring instrument and measured object has concretely entailed.

(10) Therefore, in accordance with the position of «Heisenberg 1955», the Copenhagen interpretation is seen as a valuable, currently heuristically justified tool. The aim is to trace back the principles of Bohr, Heisenberg, Born and Einstein, which have proven themselves in practice, to conclusions, which can be justified scientifically — empirically.

(11) It is therefore not necessary to assume that the world must be absurd because of the nature of the micro-world.

Examples for the attempt of an application.

If one accepts the arguments presented above, it makes sense to present a model for the cosmological evolution, which assumes energetic field, conservation of energy and evolutionary dynamics in the formation of the principles of order. According to this, the electromagnetic fields appear only as a consequence of the empirically indisputably proved inflationary process. From this stage the standard model remains unaffected by the change of the world view. (Example 1).

If this derivation is accepted, the second application example becomes understandable: It leads to the conclusion that the energetic field is to be understood as discontinuum, which is experienced by the «wall observing researcher» and the measuring instruments used by him, however, both as discontinuum and as continuum. (Application example 2).

This also seems to make the third example insightful. It is to make the discussion proposal on the nature of the effectiveness of the electromagnetic field on other objects insightful. (Application example 3)

Finally, an attempt is presented to apply the model to the phenomena of entanglement. (Application example 4).

Example 1: Modification of the evolutionary process in the very first phase of the very early universe».

The standard model of cosmological evolution can be taken from the relevant literature. This paper concerns only the phase, which is classified in the standard model with a duration of approximately up to 10–20 seconds after the Big Bang. For this phase any empirical argument is missing for the decisive section. This is seen also by many cosmologists in such a way, so that also the question is discussed whether in this phase the laws of nature have been valid at all. The standard model is determined by Einstein's world view, according to which electromagnetic physical units are the starting point of the events, these move themselves and that with speed of light. The empirically proven area, in which all objects of the light matter move today is however unimaginably bigger than would be attainable with an expansion of this area with speed of light. Since the Big Bang and its characterization is state of the knowledge, there must have been an inflationary phase. In addition it was determined that this area has expanded around the 1030 to 1050-fold compared with the postulated situation before the inflation. For cosmologists and quantum physicists it may be everyday life to imagine what this means, other real scientists possibly not. It is about the difference comparable to the expansion of the diameter of the double helix of the DNA to the space, which the light runs through in 100 million light years. And this expansion had taken place in a quadrillionth of a second.

In the standard model it is assumed that it had come to a superposition of the own movement of the physical actors by an extra-scientific influencing variable not empirically justified, which had led to this passive space effect. It also remains open how this passive spatial effectiveness is made compatible with Einstein's empirically proven position that physical objects exclusively move actively. These problems are eliminated in the proposed model.

It is not clarified in the standard model, how it came to the braking to the speed of light as maximum local space effectiveness. In approach A it is about a phase without electromagnetic fields. Therefore also this problem is eliminated. Moreover, the law of conservation of energy has to be considered. Which «demon» would be able to brake every single electromagnetic field in such a way that it would not remain in uniform motion with inflationary effectiveness?

This is to be considered because «universe» is not the name of something which exists, like the Oval Office in the White House with its solid walls, the furnishings which can be adjusted by people according to their needs etc.. «Universe» is a term invented by scientists to make short a long story that is assumed to have consensus on the multitude of aspects conveyed by the one word. So, for example, that it is about this area within which all physical objects move, which themselves again have an evolutionary history. Of course, the universe has no boundary like the space of the Oval Office. But for reasons not sufficiently known up to now, the physical actors adhere not to move over this «edge» arbitrarily. Nevertheless, the escape motion of the «edge» can be determined empirically. It lies clearly under the speed of light. With «universe» is also conveyed, but also not really made understandable, that the universe looks the same, from which direction one looks at it. Obviously, the energy is also approximately equally distributed over the whole area etc. It is indisputable that every single object moves individually in the «space» and considers the energy distribution individually, but in a generalizable way. If one wanted to brake in the inflationary uniform movement to light speed massively (passively), one would have to intervene therefore at the unimaginably big number of single objects individually and therefore in each case in unique and dynamically changing way that all is reached what is proved as result empirically. Therefore, the braking cannot have been caused by a single action on «the universe». Nevertheless — and this is another challenge — it has been possible to present formulas which correctly determine the transition from the inflationary phase to the speed of light in a more generalizable way. But also numbers, diagrams and scientific terms do not affect anything by themselves. They are free inventions of the human mind, as Einstein reminded. They stand for something in the reality, which the mathematically and graphically expressible results cause. These can be only the actors, which were present to this evolutionary stage — if one is a follower of a single, not predetermined evolutionary process.

Therefore, if for logical reasons any other explanation — except the intervention of an actor not subject to terrestrial possibilities — must be excluded, then «what remains must be the truth, however improbable it may sound» (Sh. Holmes). And the possibility is that each single energetic field — in this model more precisely single mechanoeiton° — has chosen among the theoretically many possibilities the one which we can observe with our measuring instruments (from light matter).

But it is to be taken into account that there are two or three ways of observing. That of the researcher, who is limited like a «wall-observer» to what he can raise directly or mediated by his measuring instruments (from light matter) and the position from the view of the actors. The «wall-observer» will be led to assume a primordial force and to interpret all novel phenomena by a modification of this primordial force. From the view of the he will use his potentia just for new, different effects.

However, the processes run since more than 13 billion years without human direct or indirect observations.

These processes were — goes out from approach A — from the actors existing in each case according to their observations and evaluations. The modifications we describe from the outside in the standard cosmological models can therefore be understood as expressions of what these individual processes have led to in a generalized view. Therefore, it makes sense to try to make these processes insightful also from the «inside view» of the actors. In this process, individual dynamics becomes a determining factor.

An alternative proposal for the very first beginning of the first second of the universe.

It is assumed that the Big Bang of our universe goes back to the fact that each individual mechanoeiton has approached with inflationary speed with the intention to be the first target point considered as ideal so far, until they assumed that a further approach or also only a minimal deviation of their alignment would have led to the collision and with it to the loss of their intact uniqueness (Entanglement). At this stage, all previous experience and any previous targets (should it not have been the first Big Bang) should have been lost. Then it becomes permissible that the mechanoeitons «arrive» with not modified characteristics at the Big Bang.

The actors who have made the decision at the same time (entanglement) for the current abandonment of the aim aimed at together (entanglement) and for the flight-like turning away from this aim represent the basis for the universe today. The Big Bang is thus understood as the phase with the highest risk to the collision because of the maximum possible approach to other mechanoeitons and radical change of orientation. The principles of the conservation principle are valid for it. According to Schrödinger's assumption, in this phase all mechanoeitons experience «entanglement», both in terms of the circumstance of moving together towards a point, which is associated with risk, but also in terms of the possibility of compatibility of the approach as well as the current relevance of fully focusing on the preservation of individuality by moving away. If one assumes the actors this, then one can explain that the alignment has led to this spherical formation of the universe as it is represented in the classical graphics of the evolutionary course of the cosmos, before the form of the universe gets more and more to the today empirically proved smooth «edge». The change of direction necessary for it can be attributed to the consideration of the consensus of the alignment to a common aimed but not observable goal (permanently in relation to each other within the expanding universe) or to the re-achievement of the already once reached goal (cyclic universe, pulsating universe), because the attention is no longer exclusively directed to the avoidance of the collision).

To the explanation of the self-limitation of the available area

Since all energetic fields move forward in uniform motion next to each other, it may be assumed that they do not experience their own inflationary space efficacy forward, but the relative ones to the other actors. This corresponds to the experience that everyone has already made: He thinks he is sitting motionless on a chair and sees his friend coming. Neither of them feels that they are moving together with the earth around its axis with about 800 km, at the same time with about 100,000 kilometers per hour around the sun, which is orbiting the Milky Way with about 800,000 km/h, etc. Thanks to logic, one can follow these movements and take them into account when planning the duration of flights in or against the direction of rotation of the earth. Therefore one may assume the energetic fields to recognize that the aim of their self-alignment was so far only to keep the distance to others so large that there was no risk for a collision, but now it is to be stated that unintentionally very large distances between them have arisen. This can be explained by the subjectively imperceptible, but logically detectable inflationary forward motion. With the grasping of this connection it would be clear to the mechanoeitons what tremendous potential they have to be space-effective, but also that this potential is used practically exclusively for aiming at an ideal, not even observable consensual point. What would be more obvious than to decide not to give up the common goal — already because of the principle of conservation — but also not to continue to strive for it with this speed.

If you don't want to reach a destination so fast that you have to reach it at the same time as others and also have to be space-effective at the same speed (conservation principle), you can achieve this by making detours. For the detours, there are no consensuses that have to be kept. But if one still wants to reach an agreed goal at the same time, one has to agree with the partners who have conceded to arrive at the goal not earlier but at the same time, when one wants to be at the goal. In order to be sure that everyone will stick to the agreed consensus, it is necessary to introduce a means of control, the observance of which can be checked by everyone through observation. If one would agree thus that one aligns oneself with light speed to the ideally imagined goal, otherwise however arbitrarily, everyone must appear again and again also on the line in the direction of goal point, so that can be observed that the consensus is kept. In the meantime, everyone is free to move again. The exact return to this line is also a challenge in self-alignment, so it is not just a voluntarily chosen restriction. The achievements to be imputed to the actors for this purpose are only modifications of what was already necessary for the Big Bang: radical individual changes of the alignment without collision, observability of all others in consensus, compliance with the consensus as well as the flexibility in the use of the immense potential of energetic and creative efficacy released by the consensus on the delayed common arrival at the target point.

The constant consensually recognized goal is thus maintained in the meantime only in just symbolic small way, so vanishingly small is the space effectiveness by

light speed in comparison with the inflationary space effectiveness.

The observance of the speed of light and the consensus concerning the total alignment to the ideally imagined aim point makes understandable that thereby also inevitably the «edge» of the very early universe is formed. This common «edge» is an additional default for future arbitrariness.

The description so far seems to cover the empirically graspable commonality of dark energy and quantum bound actors.

To form a common progenitor of the dark energy and the electromagnetic fields.

In the inflationary phase, the area within which physical actors could make their self-determined alignments in any direction has expanded so vastly that these alignments are possible without any risk of collision. This opens up the possibility of agreeing on more challenging models of motion. The easiest way to achieve this is to integrate additional targets. This was also the assumption of Einstein, who based GTR on Mach's principle among other things. According to this, the existence of a goal is the precondition for movement in our world, whereby it is to be considered that the avoidance of a disadvantage, which would otherwise occur is also a reason for the movement away.

To an additional goal the actors could come in this phase, in which only like ones were in the environment, by agreeing to be for each other reciprocally goal. If one assumes a not predetermined evolutionary process, it must be free to decide for this option or not, and how many mutually make themselves the reference point. As always in the evolutionary process, one can only see from the outcome what choice has been made. About one third of the energy carriers have made the choice for «pairing» which has led to the electromagnetic fields, Dark Matter and Light Matter. Those, which have not decided for it can be summarized as Dark Energy.

From the possible evolutionary differentiation of the dark energy with its approximately 2/3 of the entire energetic potential of the universe nothing else can be said empirically justified than that, in which they are of the same nature as the paired energy carriers. This concerns only the common preliminary stage and therefore their contribution to the «edge» of the universe.

About the formation of the «Ur-Electromagnetic Field

Starting point for the paired development might have been an «Ur-Electromagnetic Field», where one mechanoeiton takes the role of the electric field and one mechanoeiton takes the role of the magnetic field. Their consensus is based on traveling in a straight line at the speed of light and approaching each other maximally at predictable distances, which corresponds to phase as a quantum, and then moving away again. Connecting the points of maximum approach allows the observer to see the alignment. This leads to the fact that in the phase of approach into the quantum stage the mechanoeitons cannot avoid each other, which is the case in the phases between the stages of maximum approach (quantum) without difficulties. There the two partners move in a most creative mutually stimulating way in an inflationary expanding area, in which the evasion can be built into the creative self-alignment without problems. The exact rhythm for keeping the consensus does not allow in this phase the forming the pair to modify their alignment arbitrarily in order to avoid even collisions. Therefore, all «others» must take care to avoid the risk of collision and keep appropriate distance. Their «advantage» is to realize that the consensus on reaching the imaginary goal point together is respected.

It is also necessary to make understandable how the different electromagnetic fields with their characteristic frequencies could have come about. They can be understood as cooperations with many autonomous «original electromagnetic fields». For the cooperation, however, a sufficient reason is needed. This may be derived only from the assumptions the previous state. Assumed is the «symbol intention°» of the actors of the micro-world to maximize the possibilities for creative self-alignment.

This can be illustrated with a parable, namely that of dancing, i.e. a game of movement that has nothing to do with the struggle for survival. Nevertheless, one can want to win the dance competition. Then you look for the partner who has the best chance for the music played. This selection criterion reaches up to the sensory creatures. Then one selects the music after it to be able to win the partner. (This is not discussed in these articles. But it shows that the playfulness in the movement is helpful to make process flows in the micro and market value insightful. With the parables of the « dance games» only a suggestion of Nobel prize winner Goll- Mann is taken up. He compares the dynamics of the processes of quarks with a tennis game, in which the players also change their roles.) Then it becomes understandable that the admission of a further «pair» is then accepted if with it a desirable additional «dance game» becomes possible. Remarkably, one does not come to this insight even if one has understood the formula and can also apply it correctly°.

However, with the inclusion of further «dance pairs» also arises the need to communicate this to «others» and to clarify the thereby increased need for free space which «the others» must respect in order to avoid collisions. Thus, one could understand the formation of the characteristic frequencies and the increase of the potential present in the smallest area of all the involved pairs in the quantum. Therefore, the energy of the electromagnetic field is represented by the energy of the quantum.

This assumption seems to be in good agreement with Einstein. Everything else, also the frequency, are only consequences, derivable from the energy of its quantum. Einstein expresses this in a letter to Schrödinger on the occasion of the publication of his book on wave mechanics, in such a way that the energy would be ultimately expression of the reality. « Not E and ny, but E or ny. And

not ny, but E (has in the end reality!) But mathematical verse I cannot make myself one on it» [7]'.

It «fits» also to Schrödinger who assumes that the multiplicity of realization possibilities of an electromagnetic field is captured by the quantity «phi» introduced by him. This would then correspond to the multiplicity of «involved pairs» and the «possible dance games» brought along. Since actors in the micro world are assumed to be quasi-ideally effective, this would mean that their attention can be «quasi-ideally» directed to a particular «dance game» that one has started with a fellow player, and the other games with this fellow player are then not used. This «dance game» would then be implemented nonlocal, as all «dance games» of electromagnetic fields. .

Creative self-direction was assumed to be the real reason to enter into collaborations. Therefore, this view would be consistent with Schrödinger's position that quantum objects that enter into cooperations to more creatively fulfill their primary intention would be nonlocal effective. The local effectiveness accessible to the researcher appears thereby «only» as a condition, since with the locality only is communicated that one keeps the date for the common meeting place and communicates which free space needed by the others is to be considered, so that it comes to no collisions.

Most Basic Actuator — Particle

This model assumes that the evolutionary process was not predetermined. That which can be observed must be made intelligible from the prior states. Not only electromagnetic fields but also particles are to be observed. The principles of the electromagnetic fields are preserved, if it is assumed that after the phase, in which «classical» electromagnetic fields with their frequencies have come, an additional modification of the orientation of new electromagnetic fields to be included has come.

Thus this electromagnetic field becomes the starting point for the differentiation of further radiations as well as for the differentiation to particles. For this common initial actor, from which all objects of the macrocosm derive, the term «Most Basic Actor» was chosen. In the parable of dancing, the differentiation can be compared with the invention of the «Fleckerl-Walzer. The new thing here in comparison to e.g. Paso Doble or Viennese Waltz is to use the creative possibilities while keeping the prescribed dance steps no longer in the use of the available free space on the dance floor, but by movement of the partners around each other on a narrowly limited space. The forward movement in space remains, if only to avoid colliding with others. As every dancer knows, the weight and the rotation speed of the partners and the «others» now become the center of mutual interest. On the need of terminology according to the principle of Comprehensive Simplicity, an additional term is needed for the outside observer: that of mass (and angular momentum). From the «inside view» the assumption «m corresponds to h multiplied with «ny» and therefore also «$E=mc^2$» is sufficient for the energetic potential of the mass.

This leads for the outside observer to include simplifying the mass into the indication of the common motion to each other. As long as thereby only the common consensus are kept, it is to be expected that this is not experienced by those, who keep the consensus. But it will be, if there are additional impacts.

With this, the reason for the peculiarity, which Einstein called his «happiest thought» and the prerequisite for the development of the General Theory of Relativity, becomes understandable: That in free fall one does not feel one's own space effect in spite of the acceleration, but any reduction does. The fundamental consensus is just kept or not.

So, if one assumes that particles and therefore matter is an after-state, which goes back to the «Most Basic Actors» and therefore back to electromagnetic fields, than this must be empirically testable. This proof was given by de Broglie with the matter-waves.

Approach A assumes that evolutionary gains in the micro world are only «accepted» if they are possible without restriction of once acquired gains for self-determined modification of motion. This means that all gains are «at the expense» of the potential provided for reaching the ideally conceived goal as long as the borderline for this capacity is not reached. If this assumption is true, then the energetic potential available for it, must become smaller and smaller in the expansion phase of the universe. This can be proved. The initial potential of the mechanoeitons enables the inflationary space effectiveness. The energetic potential, which can be calculated from the formula E=mcI, is in contrast — as expected — negligibly small but in relation to the daily available energy gigantic. One kilogram of any substance of light matter would have therefore 24.2 billion kWh. This corresponds to the energy (not available to us) of 2 billion liters of gasoline. The energy released in radioactive decay is still more than a million times greater than the chemical energy of the same atom [20].

Reversible — not reversible

With this approach, it becomes obvious why the processes in the micro world are reversible. With the dynamis available to the actors of the micro world, after all, all processes are still realizable for which the actors of the micro world decide.

It remains open why the processes in the macro world are not reversible or why they exist at all. Since it is assumed that the dynamis janus-headedly enables two types of efficacy, which in principle must always be used simultaneously, the conclusion is obvious that with reaching the atom not only the energetic potential for novel realizations has been reached, but also that the capacity of the discrimination-related potential has been exhausted. Obviously, this is not the case. Why this is so can be made insightful by experiences from the everyday world. Who does not remember his first driving attempts with a car: One had to concentrate fully to make the necessary single movements at the crampingly held steering wheel, when giving gas etc... Nevertheless, the car bounced forward

rather like a billy goat. And you couldn't hear the loud voice of the driving instructor. Two weeks later, it was all automatic. And after a few weeks, you could have an undisturbed conversation while driving. This describes the process from steering to regulating. It takes much less discrimination ability and also less energy input. Adherence to the «laws of nature» can be understood as the equivalent of the state of regulation in the micro-world. However, the energetic capacities saved by it were used up, because the assumed symbol intentions concerned exclusively modifications in the use of energy. Thus, the conservation principle is not violated if free capacities of discrimination° are used for the classical physical and chemical processes. Simultaneity of use does not ideally mean identical quantity in, use. For new movement creations the necessary energetic resources are available however only if they are saved at other possible realizations.

Transition to the Standard Model of Cosmology

In the course of time, which is shown in the standard model of the cosmic evolution, at any rate from 10^{-20} seconds after the big bang the existence of particles is to be expected. The explanation of further modifications of the evolutionary cosmological process are therefore not necessary with application of the «extended model». Therefore, the appearance of the dark matter is compatible with this model.

Example 2: To the question wave or particle.

This dilemma must occur, if one starts from the position of the researcher as a wall observer. He has only measuring instruments at his disposal, which consist of light matter. Therefore, from the observation fact, the conclusion must be drawn that e.g. photons appear both as continuum and as discontinuum.

If one starts from the «view of the concerned actors» and distinguishes between the observation in the internal relation and the observation of the «others», the dilemma seems to disappear: From the internal view, the mechanoeitons «dancing» with each other are a discontinuum. The individual positions are mutually observed, evaluated and individually creatively answered. For the evaluation of the movements of the «others» it is sufficient simplistically to grasp their total dynamics, i.e. the continuum.

The usefulness of this principle can be illustrated by experiences that every music enthusiast can make himself: If he observes the baton of a conductor at a concert, it will appear to him as a continuum. But the conductor is able to express his personal view on the contents of the score by the exact dynamics of the positioning of the baton in such a way that everybody in the orchestra can recognize which message he has to pay attention to.

Without any reference to the macro world, the discontinuum nature of the actors at the stage of the Big Bang is obvious already because at the Big Bang it is assumed that the space requirement of all energy carriers of the universe had been unimaginably small. How should this be compatible with a continuum nature?

So the presented model seems to be able to offer a solution not only for the body-soul problem which is so decisive for biology, medicine etc., but also for the wave-particle problem which is possibly just as relevant in physics.

Example 3: On the nature of the effectiveness of electromagnetic fields on light matter.

The connection between the frequency of radiations and the distance-dependent effectiveness on objects of light matter is so well proved by empirical studies that it can be predicted mathematically. Why this is so remains open. However, if one assumes the intention to avoid a collision, although the actors of the electromagnetic field themselves cannot avoid it, it becomes obvious that the higher the frequency and thus the energetic potential of a field is, the higher the probability of a collision and therefore the more urgent the avoidance of the other actors becomes. Therefore, if this distance is undercut, proportionally strong effects must occur.

Example 4: The link to entanglement.

The Nobel Prize winning work for the special case of entanglement can be compared with the studies of de Broglie, in which he demonstrated that under special conditions the wave nature of matter can also be demonstrated.

The relevant arguments are presented above: Entanglement seems to be a special version of the principle of consensually as prerequisite to win individual options. This allows the understanding of the evolutionary process as will be described in Approach B.

Further considerations.

In the model, it is assumed that any process of the objects of the microworld does not happen by force but voluntarily in order with consensuses. If this is true, empirical evidence should be able to be brought forward, which becomes insightful if the actors are assumed to have freedom of choice. Then, for example, it would also have to be possible to observe offers of cooperation that have been realized but have not found a lasting willingness to be adopted. In this way, the temporary particle zoo could be made comprehensible.

Since consensuses are not understood as laws of nature that have been prescribed by a determiner outside the system and therefore must necessarily be obeyed, but as voluntary agreements, there should be the possibility that temporary deviations from consensuses occur. Thus, for example, the tunnel phenomenon could be made intelligible.

Summary

Einstein's 1935 position on nonlocality in the EPR becomes insightful when one considers his methodology for expanding knowledge. Had the findings of Clauser, Aspect or Zeilinger been available to him, he would have further modified his world view — as in other cases where there was broad consensus on new phenomena, possibly as proposed in Approach A.

1) The world view finally chosen by Bohr leads to the loss of the question of causality. Einstein demanded their preservation.

2) The accusation that Einstein would have classified the quantum theories as wrong or rejected them, goes nowhere in the light of the literature. He demanded for them as for his own theories «completeness» not only in mathematical point of view but also in the insightfulness of the used terms.

3) Since he did not succeed in this for GTR, he confessed in his last lecture in 1954 that also GTR does not fulfill the requirement of completeness set by him and explained why.

4) The technique of principle theories developed by him makes it possible to deal scientifically with evolutionary prior states which are no longer accessible to empirical testing.

5) This leads to an interpretation of the cosmological evolution without having to fall back on the effects of extra-scientific causers used so far.

6) The approach A allowed an interpretation of the cosmological evolution with the energetic field as the evolutionary oldest object of the microworld, without having to fall back on the previously used influences of extra-scientific causers.

7) Applying this point of view, one can solve e.g. the wave-particle dilemma and why the effect of electromagnetic fields depends on the strength of the fields.

8) Empirical evidence of the voluntary nature of predictive processes and necessity of their coerciveness is presented.

9) It enables an understanding of why natural processes in the micro-world are reversible, while those in the macro-world are not.

10) The access A makes the evolutionary process in the microcosm understandable from the view of the outside observer, but cannot close the gap to «Darwin». Thus, the central goal of Einstein and the hope Schrödinger placed on the physics of the future remain unattained. Approach B will attempt to close this gap.

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