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THE THEORY OF MATTER

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Introduction

It is hardly possible to state with authority that modern physical systems in general and the theory of relativity in particular have succeeded in solving to complete satisfaction the amassing physical - and in their very essence, philosophical - problems having to do with the fundamental categories of these scientific disciplines. We do not yet know the basic model of moving matter, nor the solution to the principle of motion, nor the definition of the concept of time and space; there exists no satisfactory explanation of gravitation, and physics is at a loss when confronted with relativistic inconsistencies such as the paradox of time and infinite values of the relativistic equations. All this notwithstanding, the principles of the theory of relativity are defended with such obstinacy that one feels compelled to speak - rather than of physical science - of a faith in dogmas and stereotypes in which physical thinking has become mired. Concepts like "dilatation of time" or "contraction of space" are employed indiscriminately, and no attempt is made to first answer to satisfaction the vital question of what in fact is time, space, matter, motion, inertia, gravitation, etc. One builds on hypotheses leading to insolvable dilemmas; yet the courage to adopt a fresh line of thought and approach to the basic categories is regarded as something little short of sacrilege. Thus the theory of relativity is in effect granted the privilege of immunity.

Preventively and in profound humility let us pose the following question: Is it at all impossible to at least try to devise a model of the physical world, which would result in no inconsistencies but offer a logical explanation of physical reality without having to resort to mental "acrobatics" that accompanies the relativistic interpretation ?

In the light of what has just been said let us make an attempt to formulate new principles of matter, motion, time, space, gravitation, inertia, etc., and confront them with the theory of relativity.

Matter

What is, indeed, matter? How can it be defined? We know that motion is an inseparable property of matter - there exists no matter without motion, nor motion without matter. The one and only matter that exists is moving matter. If we wished to define matter as broadly as possible, we could state that matter is everything that is a carrier of motion. Matter and motion form a dialectic unity. All matter is in continuous motion.

The opposite to matter is not anti-matter in the usual sense of the word, that is matter with different properties since that would be matter, too. The opposite to matter is non-matter, i.e. an absolute, mass-less space that forms an indissoluble dialectic unity with moving matter. Moving matter and the absolute mass-less space are thus antitheses that exist in indissoluble unity.

The question is frequently asked whether there exists some prime substance, some prime foundation of all the forms and manifestations of matter that we see around. Whether there exists some objectively elementary particle, no further divisible and transmutable, the very foundation of all forms of matter. This question was already pondered over by ancient philosophers. We know the views concerning it of, for example, Anaxagoras, Democritus, Leucippus, and others. The gist of their hypotheses is the idea that there exists a fundamental, further indivisible unit of matter, in other words some prime substance of whic all the other forms of matter are composed. Of the contemporary opinions stemming from the idea of the existence of a fundamment al prime substance, those of the German physicist W. Heisenberg have evoked most interest.

Let us allow that there objectively exist such elementary particles, such elementary quanta of moving matter. To facilitate subsequent exposition let us give them a name - for example "kinetons" to express the basic property of matter, motion. From the point of view of the dialectic law of unity and contest of opposites inherent to matter, we may assume that the counterpart to the elementary particles - kinetons - are elementary anti-particles, antikinetons. "Kinetons" with their anti-particles "antikinetons" thus represent a hypothetical foundation of all the existing forms of matter.

Since by our assumption these elementary particles make up the most diverse forms of matter, it is reasonable to suppose that they are endowed with properties that enable the new forms to come into being. What are the basic properties that we are going to ascribe to our elementary particles?

The first and foremost is the property of indivisibility and intransmutability. An elementary particle cannot be divided in smaller units nor transmuted into another particle, say an anti-particle.

Next comes the orientation of elementary particles in space, the direction of their motion. Elementary particles are vectors. By this hypothesis all matter is composed of elementary quanta of moving mass whose characteristic property is motion. The vectorial result of these "elementary vectors" then determines the direction of motion of a body as well as the velocity of this motion. The larger the number of kinetons oriented in a direction, the higher the translational velocity of the body.

It is, however, also necessary to explain such manifestations of matter as "repulsion" or "attraction". To all indications, the spin of elementary particles plays an essential role in such manifestations. Consequently, the spin is another characteristic property that must be attributed to an elementary particle.

The mechanisms of "attraction" and "repulsion" of masses are probably no force processes but signal processes brought about by the change of orientation of elementary units of an object that has found itself in a signal field.

Since to us matter means solely matter in motion, there might arise the question of what is the velocity with which the motion is executed. The answer is somewhat surprising: the motion of matter is performed at a single velocity, intrinsic to matter, i.e. at velocity c.

Summing up the foregoing considerations we may state that the basic properties of elementary particles (kinetons) are indivisibility and intransmutability, orientation in space, spin and velocity c.

The forms in which moving matter manifests itself may be classified in two fundamental types: 1/ substance and 2/ field. Substance is understood to mean the at-rest forms of matter of all the known phases, field - the radiation forms, e.g. light. One may ask the question: What was first in the history of matter, substance or field? I believe that the answer is to be found in the dialectic principle according to which the development proceeds from the simple to the complicated; this then would suggest that field was the prime form of matter. Matter appears there in its simplest form, with no bonds whatsoever, as we see it in the radiation forms of matter, e.g. electromagnetic waves propagating through space with velocity c.

It seems that both the physical facts and logical considerations converge to the unique answer: Radiation matter propagating in space at velocity c is the basic, historically first form of matter. It is undoubtedly on this radiation material basis that further qualitative stages of matter, i.e. the at--rest form and all its modifications, come into being. The coming into being of at-rest matter means a dialectic jump in the history of matter. The translational motion of matter in space has changed in it into the internal motion of matter, atomic and subatomic motions of at-rest matter. The straight-line translational motion thus changes into rotational, vibratory, whirling and other motions. It may be supposed that this takes place owing to the interactions between particles and anti-particles, that there arise specific bonds between them, and these bonds subsequently become the cause of the "at-rest" forms of matter, i.e. of forms with internal motion. Once the bonds have been destroyed and the elementary particles freed, the "at-rest" form of matter turns again into the radiation forms.

It may, therefore, be supposed that the at-rest form of matter comes into being whenever the translational motion changes into the internal one. And vice versa, the at-rest form of matter expires whenever the internal motion changes into the translational one.

Each material object contains a definite, absolute amount of motion. This is its kinetic charge that can be expressed by the familiar equation $E = mc^2$. For each object this quantum is an absolute value; it is the quantum of motion that can be realized either in the translational form or in the form of internal motions. For a given object the sum of these motions is constant, however. It is, therefore, a gross error if the theory claims that the energy of at-rest mass in translational motion is not $m.c^2$ but $m_o.c^2/\sqrt{1-beta^2}$.

An object moving with translational velocity c can never possess the "at rest" form of matter. And vice versa, an object with "at-rest" mass can never move in translational motion at velocity c. A part of its kinetic energy is namely bonded in the at-rest forms of matter. In order to achieve translational velocity c it would be necessary to change the at-rest form of matter into the radiation forms, for example the electrons and positrem into the quanta of electromagnetic radiation (photons).

Consequently, matter has two possibilities: either the limit velocity of translational motion and the radiation phase of necessity connected with it, or a velocity less than c , or possibly zero, and a quantum of "at-rest" matter consistent with it. According to the law of conservation of energy, motion cannot come to an end. It can only change from the translational form to the internal one. However, this change affects the absolute value of kinetic charge of a given object in no way.

In connection with our discussion of the fundamental properties of matter, it may serve a useful purpose to mention the so-called "thermal death" of the universe. In the interpretation of the second law of thermodynamics there was conceived the notion about the entropy and thermal death of the universe. It is argued that the final stage of all transmutations of matter is thermal equilibrium, an irreversible state that can be described as the "thermal death of the universe".

The notion about the entropy and thermal death of the universe points, however, to only one tendency of the physical world, to only one trend of matter, and forgets the opposite tendency, one may say the "anti-entropy", an equally strong principle in the manifestations of moving matter. The latter is the ability of all forms of matter to interact among themselves and produce new, ever more complex qualities. Thus on the one hand, there occurs the decomposition of intricate systems into their parts, perhaps to the simplest elements of matter, and on the other, the production of new and increasingly complicated qualities from the lower and simpler "precasts" of matter. These are two interpenetrating tendencies, two opposite trends in which the existence of matter manifests itself.

In the transmutations of material forms we thus come across both the trend from the radiation forms to the substance and that from the substance to the radiation forms. And it is just this unity of two opposite tendencies that constitute a strong argument against the theory of so-called "thermal death" of the universe.

In the same physical world there proceed simultaneously two opposing processes, analysis and synthesis, a continual change that is nothing else but a regular product of the fundamental properties of matter and its motion. The oppositiveness of the primary elements of matter (particles and anti-particles) and their properties excludes on principle the existence of such states as the "thermal death of the universe".

Motion

Motion is the basic property of matter. There exists no matter without motion nor motion without matter. The translational motion of an object in space, its direction and velocity are given by the vectorial sum of all the elementary vectors of the body, the orientation of the elementary units in space playing a decisive role in this respect. The orientation in space is an all-important factor for the motions of bodies as well as for their interactions.

If the vectorial sum of all the elementary vectors of a body is equal to zero, the body is (from the point of view of translation) at rest relative to the absolute space. If the vectorial sum is different from zero, the body moves in the direction of the resultant vector.

The larger the number of elementary units of moving matter oriented in a direction, the higher the translational velocity of the object in space. Were all the elements of motion of the body oriented in one direction, the body would move with the velocity of light. As follows from the nature of the thing, this velocity, that is to say this degree of orientation cannot be attained but by an object with zero at-rest mass (e.g. light). The attainment of this velocity by an object with an at-rest mass is possible only on the condition that the at-rest form of matter will change to radiation. The at-rest form of matter represents in fact such bonds of the inner structure which do not permit total orientation of all the elementary units of matter in one direction. Once those bonds are loosened, however, matter changes to the radiation forms, e.g. an electromagnetic wave flying through space with velocity c . The internal motion of matter has in this way turned into the translational motion. The kinetic charge of a body can manifest itself either in a translational motion or in an internal one. For a particular object the sum of these two motions is constant. The higher the translational velocity, the lesser the internal motion of matter. And at velocity c all the at-rest mass of the object would have changed to the radiation form. Whatever part of the total kinetic charge of matter is not realized as the translational motion in space, is latent in the internal motions (rotational, vibratory, whirling, etc.).

As to the velocity of motion of matter: the physical theory starts out from the conviction that matter is apt to exist in different kinetic states, from zero velocity to the limit c. The theory is in error. Actually, matter has no other possibility of motion but motion with velocity c. Velocity c is the only velocity that nature has at its disposal! Only with this single velocity can matter pass from one of its states to another. The objection that the bodies we see around us move not with velocity c but with velocities incomparably lesser, or that one object moves faster and another slower, is merely an illusory objection. An explanation is offered by the hypothesis of Ladislav Urbánek whose idea seems to be so revealing as to merit to be ranked with the most fundamental ideas of the history of physics. It can briefly be expressed as follows: motion executed at velocities lesser than the limit one consists of intervals (phases) of rest and motion. What macroscopically appears as a faster or slower motion are merely different quanta of at-rest and in-motion phases, the in-motion phases always having but velocity c. Velocity c is namely an attribute of matter irrespective of its form. The "Morse code" of nature (rest - motion) is very simple, and by its means nature can present to our senses a display of the most diverse velocities. Like the Morse code consists of dots and dashes, so is this a combination of at-rest and in-motion phases.

The higher the velocity of an object, the higher the number of in-motion phases and the lesser the number of at-rest phases; at lower velocities the situation is just the opposite. At velocity c motion consists exclusively of the in-motion phases. In the translational motion the at-rest phases appear only at velocities lesser than c , i.e. in objects with an at-rest mass.

The existence of at-rest phases does not mean, however, that the motion of matter has completely vanished in these phases. No, it did not. Whatever part of the kinetic charge is not realized in translational motion, is manifested in internal motion. And whenever all of the motion is realized in translation, it cannot manifest itself in some internal motions. This why an object moving with translational velocity c has no at-rest mass, i.e. mass with internal motion. The higher the translational velocity, the lesser the internal motion of matter.

The external (translational) and internal motions of matter are so bound one to another that to the in-motion phase of translational motion falls the at-rest phase of internal motion and vice versa, to the at-rest phase of translational motion falls the in-motion phase of internal motion. And the sum of these two complementary kinetic processes (external and internal) gives always a constant result for any velocity v of an object.

Therefore, matter is always in motion, in motion with velocity c. Whatever is not realized in the translational form, is realized in the internal motions of the body. To the in-motion phases of external motion fall the internal at-rest phases and vice versa. If a body moves externally, it "rests" internally. This also explains the assertion that there exists only one velocity of matter's motion. Whenever motion is involved, it takes place at this velocity. Nature knows no other velocity nor has other velocity at its disposal. According to the hypothesis of L. Urbánek, motions seemingly executed at lesser velocities are but combinations of at-rest and in-motion phases, the in-motion phases always being realized only at velocity c inherent to nature.

Absolute and relative motions

According to the theses of the theory of relativity every motion must be considered a relative motion, i.e. a motion relative to a definite reference frame. Einstein and Infeld have the following to say in this respect: "Motion of a body is always understood to mean a change of its position relative to another body. It is, therefore, against common sense to speak of motion of just one body".

The theory of relativity consequently does not recognize any other but relative motion. If the distance between two objects, A and B, varies, then it is equally right to claim that object A is in motion while object B is at rest, as to defend a wholly opposite assertion. The theory says for example: If motion is relative, then the sentences "the train moves relative to the rails" and "the rails move relative to the train" have the same sense.

Originally this relativity concerned only rectilinear and uniform (inertial) motions. However, the general theory of relativity has proclaimed relative even accelerated motions. It argues that acceleration can be replaced by the gravitational field and in turn, an accelerated motion by rest in the gravitational field.

Let us analyze these views at some length:

According to the theory, an isolated body cannot be said to be at rest or moving with a uniform rectilinear motion. The same holds about another body. However, if we judge the two bodies relative to one another, and if they move closer to, or farther away from one another, we may logically conclude that at least one of them must have been in motion even before, and that in absolute motion in the absolute space irrespective of the fact that this could not be detected by indicators. The motion of such a body though not revealed except by the relation, did not arise from the relation but had existed before. Every moving closer of farther away of two bodies in space is therefore a proof of the absolutness of motion and space. Motion of such a body relative to space would exist even in the case were a comparison with another body not possible.

There are other objections, too. If one says that"motion of a body is always understood to mean a change of its position relative to another body", this statement does not hold good about light or electromagnetic waves in general. To this form of matter, motion at velocity c is immanent, any relations to other bodies notwithstanding. The motion of light is an absolute motion in an absolute space. An electromagnetic wave cannot exist as an at-rest one. Its existence is of necessity connected with translational motion in the absolute space.

All inertial motions are also absolute motions, i.e. motions relative to the absolute space. Every true inertial motion is an absolute motion in the absolute space.

The relative velocities of bodies stem merely from various relations between absolute velocities. Were both reference bodies at rest in the absolute space, no relative motion could arise. Every relative velocity has its basis in the absolute velocity. Depending on the choice of the reference object, a body can possess any arbitrary amount of relative velocities, but its absolute velocity is only one. If the kinetic energy of the object changed into another form of energy, say thermal energy, the body could not have an arbitrary number of calories but only the amount that corresponds to the absolute value of its kinetic charge.

According to the relativistic addition theorem, a relative motion of two objects in space can at most reach velocity c.

One can object, however, that this is at variance with the objective reality because the fronts of two oppositely oriented rays move relative to one another at velocity 2c not c! This is an irrefutable fact, yet so far this question is concerned, the physical theory pretends to be blind.

The physical theory traditionally maintains the opinion that the motion of a single body in space has no sense. Is it, however, possible to disregard the notion that different degrees of velocity must necessarily have their adequate reflection also in the inner structures of matter? One cannot contest the idea that velocity has its reflection in the different phases of matter and an effect where the forms of substance or the forms of radiation are involved. I am of the opinion that physics cannot distance itself from the task of determining the motion of objects not from external relations but from the internal state of mass of the body in question.

Inertia

According to Newton's first law of motion, every body persists in its state of rest or of uniform motion in a straight line unless compelled by some force to change that state.

The physical theory, however, fails to give a detailed explanation of the inertia of matter. In what does this property of matter consist?

From the point of view of the kineton hypothesis we feel free to state that inertia involves an unvarying state of orientation of moving units of matter (kinetons). So long as these elementary vectors do not change their orientation, the body retains its kinetic state, either inertial motion or rest. Once the orientation of the elementary units is changed by some interaction, however, a change in velocity or direction of motion necessarily takes place.

Inertia of bodies is thus contingent on a definite configuration of the elementary units in the body; so long as the configuration continues unvaried, the body changes neither its velocity nor its direction. This being so, the resultant vectors remain unvaried.

If inertial motion rests on the unvarying state of orientation of the elementary vectors of bodies, acceleration may be said to be the consequence of a changing orientation of those vectors.

A new law of motion and its goniometric model
(see the enclosed graph)

This model is a geometric representation of a new law of motion according to which the vectorial sum of in-motion and at-rest phases is constant and equal to limit c (c=1).

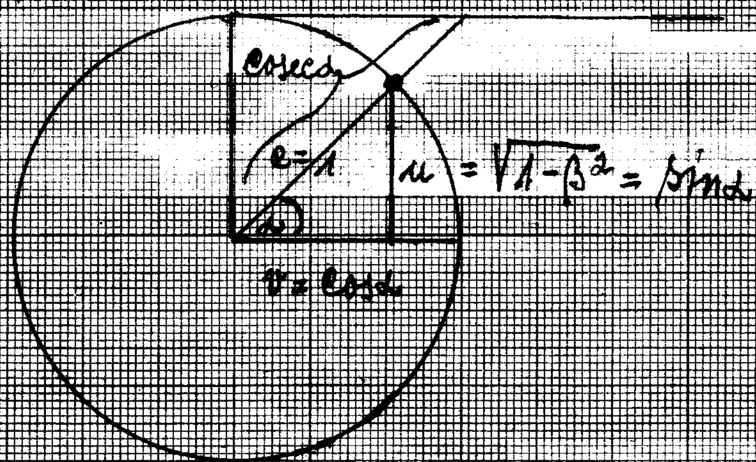
The regular relation that exists between the in-motion and at-rest phases follows from the fact that the only velocity of matter is velocity c , and from the postulate according to which the total of external and internal motions is constant for every body.

Let us take a closer look at our graphical model: Body velocity "v" (i.e. the in-motion phases of translational motion) are there represented by the circular (trigonometric) function cos alfa, while the at-rest phases (i.e. the internal motion of the body) are represented by function sin alfa. If the velocity of translational motion increases from 0 to 1, the internal motion (i.e. the at_rest phases) decreases from 1 to zero. We are dealing here with two complementary processes whose sum always gives a constant value.

As follows from the law of motion, the internal motion (i.e. the at-rest phases) equals $\sqrt{1-beta^2}$. Factor $\sqrt{1-beta^2}$ is, the-

NEW LAW OF MOTION

Goniometric model



cos alfa = v = v/c = beta = in-motion phases
sin alfa = $\sqrt{1-beta^2}$ = at-rest phases
cosec alfa = 1/sin alfa = $1/\sqrt{1-beta^2}$

New law of motion :

The vectorial sum of in-motion and at-rest phases is constant and equal to limit c /c=1/

$$\cos^2 alfa + \sin^2 alfa = 1$$

or : The total of external /translational/ and internal motions of a body is constant for every body and equal to mc^2.

$$mv^2 + mu^2 = m(v^2 + u^2) = mc^2$$

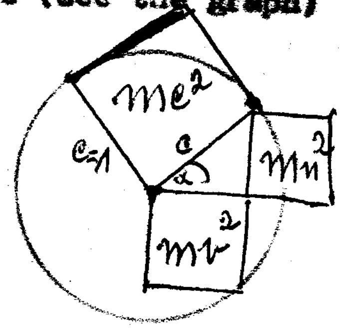
refore, no coefficient of length contraction, as postulated by the theory of relativity, but represents the internal motion (i.e. the at-rest phases) of a material object.

While the frequency of in-motion phases increases like cos alfa, the frequency of at-rest phases (i.e. the internal motion of matter) decreases like sin alfa. The two functions are bound by the familiar relation $\cos^2$ alfa + $\sin^2$ alfa = 1.

Let us use our model for an analysis of some of the typical physical processes. Let us first turn to acceleration: Considered logically, acceleration can be realized only in the at-rest phases of the object being accelerated, that is to say in the intervals in which the object is at translational rest. The higher the velocity, the fewer the at-rest phases and thus fewer opportunities for acceleration. And at velocity c when all the at-rest phases have already been interchanged by the in-motion phases, there is nothing more to accelerate and the force, no matter how large, would be of no effect. If the body velocity increases from 0 to 1, the acceleration effect falls off from 1 to 0. Accordingly, the force to maintain the acceleration on the same level would have to grow at the ratio 1: $\sqrt{1\text{-beta}^2}$. In our model, this is represented by function cosec alfa! In the relativistic formulation the question would be worded as follows: by what factor does the "resistance", the mass of the body increase? As we see, there is no increase in the object's mass due to velocity. Velocity causes but a decrease in the number of at-rest phases of the body being accelerated, and in turn of the opportunities for acceleration. At velocity c even an infinitely large force would not suffice to accelerate the object still further, since taken objectively, there is nothing there to accelerate. Everything is already accelerated. And no matter how large the force, it would work to no avail.

According to all indications, not only acceleration processes but emission processes, too, should be considered as internal action of bodies, no matter whether it is an interchange of oppositely oriented kinetons during acceleration, or internal processes whose result is the emission of photons, gravitons, etc. In the sense of the new emission hypothesis these internal processes are blocked by the translational motion of the body and not realised until the time the translation is at rest, that is to say in the at-rest phases of translational motion. Since the frequency of the at-rest phases (i.e. the internal motion) decreases at the ratio of $\sqrt{1-beta^2}$: 1, the internal activity of the body decreases at that ratio, too. Consequently, if we admit the hypothesis that not only acceleration but emission, too, are bounded to only the at-rest phases, both acceleration and emission will fall off at the ratio of $\sqrt{1-beta^2}$:1.

From the point of view of kineton hypothesis, our model may also be explained as follows (see the graph)



The external, translational body velocity "v" is given by the ratio of the oriented to the non-oriented elementary units. Velocity "v" is their vectorial result. Denoting by mv^2 the number of oriented units, and by mu^2 the number of non-oriented units, then according to our model

$$mv^2 + mu^2 = m(v^2 + u^2) = mc^2$$

The sum of the oriented and non-oriented units gives the total number of elementary units of the body, i.e. mc^2.

Referring once more to our model, we could express the new law of motion as follows:

The total of external and internal motions of a body is constant and equal to mc^2.

I believe that the advocates of the theory of relativity, too, might find "delight" in the model, for it is capable of representing - without any corrections whatsoever - the relativistic effects directly and not with difficulty as do Minkowski's diagrams.

Thus, for example, in the relativstic formulation, sin alfa (i.e. $\sqrt{1-beta^2}$) would represent the contraction factor (contraction of lengths), while cosec alfa (i.e. $1/\sqrt{1-beta^2}$) would depict the dilatation factor (for the dilatation of time, growth of mass, moment, etc.). The results can then be read direct, without any calculations, in the tables of trigonometric functions. So far as we may judge, this circumstance has completely escaped the attention of the theory.

Were I convinced of the truth of the theory of relativity, I could claim that this goniometric model clearly describes the fundamental theses of the theory and the known relativistic effects, such as the dilatation of time, contraction of lengths, growth of mass, etc. Such an interpretation, though corresponding to the postulates of the theory of relativity, would not be in harmony with the objective physical reality.

Our exposition associated with the model, has, however, nothing in common with the theory of relativity. On the contrary, it is to serve as an argument against relativistic fictions and to afford a new insight into the problems of moving matter.

Time

Theory generally admits the relativistic theses about the different rhythms of time, different passage of time in different material frames. Professionally, one speaks about the dilatation of time, especially in the so-called inertial reference frames. Popular science books refer to examples indicating that - in accordance with the theory of relativity - an astronaut moving relative to us with a relativistic velocity, i.e. with a velocity commensurable with the velocity of light, experiences a slower passage of time. For instance: in the hundred years that would elapse on the Earth, he and his rocket would grow older by only a year. It is clear to see that there time is presented as something that can pass faster or slower, something having a substantial character whose changes affect the course of physical, biological, etc. processes.

Let us take the liberty of being somewhat sceptical and pose the following question: What, in fact, is time ? Strangely enough the two scientific disciplines - physics and philosophy - in which this concept plays the primary role fail to offer us a satisfactory answer. It goes without saying that everybody would laugh at the assertion that time does not exist. Don't we know minutes, hours, days, years, centuries, etc., and can't we show by means of any clock the irretrievable passage of time ? The concept of "time" has become the most important yardstick, the most significant abstraction humanity is using for its benefit. Let us, however, proceed a step further: What are the real contents of this concept ? We know, for example, that the contents of the word "year" is the time occupied by the earth in one revolution round the sun, that of the word "day", rotation of the earth round its axis, while the remaining measures are deduced from these fundamental processes of motion. It is a time-honoured custom to divided the day in 24 hours, the hour in 60 minutes, the minute in 60 seconds. What is, then, essential here ? What is the real content of the concept "time" ? The answer is simple: motion. The motion of matter. Time is therefore but a synonym of of the motion of matter. Or in other words: time = motion. Instead of saying that someone's life has lasted, say, 80 rotations of the earth round the sun, we say that he has lived for 80 years. Thus only moving matter exists really. Nothing else can physically be proven. Time even though a convenient, is but an auxiliary concept for measuring the motion of matter. One chooses a definite, periodically repeated motion (e.g. rotation of the earth round the sun , but just as well,atomic vibrations) and with this motion that has thus become a measure, measures all the other motions and processes.

The incessant transitions of matter from one state to another, i.e. the everlasting formation of new states and simultaneously, the everlasting extinction of former states, constitute the basis of differentiating between what had been earlier and what later, that is to say, what had arisen anew and what had become extinct. And this differentiation between material changes (states becoming extinct and states newly arising),and their continual, linking-up sequence is the basis of the already deeply rooted concepts "time" and "passage of time". What is real here, however, is but the existence of matter and its changes. The concept "time" is merely an auxiliary abstract factor that facilitates a more perfect registration of the motions of matter. And of this auxiliary measure the theory of relativity has made nearly a substantial quality that can be dilated, connected with space in so-called time-space, and generally handled as a real entity.

In reality there exists only a transition of matter from one material state to another. While a definite, really existing state of matter has been called the present, those states that have become extinct are denoted as the past, and the states that are yet to come, the future. The continual, linking-up succession of the states of moving matter is then taken for the "passage of time", flow of time.

The theory of relativity is sometimes critized - and rightfully so - for identifying the passage of time with the running of the most diverse mechanisms and time measuring devices. This is borne out by various considerations concerning the question whether a clock on the earth works in another rhythm than in say, a cosmic rocket, or whether in a definite gravitational field it will work slower or faster. The answer to this, though likely to be of importance for the mechanism of the measuring device, is not so for the passage of uniform cosmic time, i.e. for the transitions of matter from one state to another.

The efforts of the theory of relativity to introduce into the physical image of the world the concept of time debased to the concept of clock mechanisms, i.e. the time measuring devices, are vain and useless .

The elementary interval of time

The elementary interval of time could be defined as the least portion of time in which the objectively least quantum of motion can be realized. Accordingly, this interval demonstrates to us the "instantaneous state of the world". The elementary interval of time cannot be a point, same as motion or the elementary quantum of matter are not points.

With what velocity does time pass ?

Regardless whether or not time is considered merely an auxiliary concept, it is necessary to answer the question of what is the velocity of time passing. Without thinking further, a theoretical physicist - in harmony with the theory of relativity - answers as follows: Passing of time is relative, multivalued, every inertial frame has its own flow of time. There exists an arbitrary quantity of time passings.

Classical physics has left this question unanswered. Only Newton wondered whether there existed at all a velocity in nature, which would adequately correspond to the passage of absolute cosmic time.

Does there exist in the universe a motion that would be the image of passing time ? I can answer this question: Yes, it does. And this motion is the motion of matter. What physics overlooks in this connection is that matter can in fact move with but a single velocity, velocity c. One must not be misled by the translational motion of objects in space ! Because whatever is not relaized by external translational motion, is relaized in the internal motions of the body.

Velocity c is immanent to matter. At the same time, it is the velocity of matter transitions from one state to another. And it is just to these elementary transitions, these elementary changes and their linking-on sequence that one can assign the auxiliary concepts of "time" and "passing of time". Once one does so, the answer to the question of what is the velocity of time passing, becomes easy, too. It is the velocity with which matter changes from one state to another. And since such a velocity is but one and uniform for all matter, the passing of time, too, must be uniform for the whole material world.

No other flow of time can be ascribed to nature but that corresponding to the transitions of matter from one state to another. And those transitions proceed with velocity c. Were the motion of light a measure of time, it would practically be the image of the flow of absolute time. We may therefore state that time has always been and is passing with the velocity of an electromagnetic wave, i.e. with velocity c. A clock devised to show the absolute flow of time would have to have hands running on the dial with the velocity of light. However, to the macroscopic perception of man's senses, the choice of macroscopic measures, e.g. rotation of the earth round the sun, is quite adequate.

The theory of relativity has in effect divorced time from the existence of matter, and made its passing dependent on the translational, inertial motion of an object relative to another object. Every object has an arbitrary flow of time, in conformity with the choice of the reference frame. The theory says: " Every frame has its own time. One and the same event when related to different material frames, lasts differently long depending on the relative motion of the frames with respect to the frame in which the event is taking place ".

By the theory of relativity, so-called dilatation of time occurs in a material frame moving with velocity c. In such a frame time passes more slowly, in conformance with the mathematical formula

$$t = t_o / \sqrt{1 - beta^2}$$

According to the general theory of relativity, time dilatation occurs even in the gravitational field. The stronger the gravitational field, the slower the passing of time. In support of the dilatation theses literature brings in nearly stereotypically the same arguments; let us therefore, examine them in some detail:

Mesons "mu"

One of the most serious proofs offered in support of the time dilatation thesis are so-called mesons. Mesons are a component of cosmic radiation,"disintegrating" on the average in two microseconds after their appearance in the upper layers of the atmosphere." It was found, however, that fast mesons live much longer than slow mesons, even "up to thousand times longer, and have, therefore, reached from the upper layers of the atmosphere to the earth's surface, which feat they could not have otherwise accomplished during their lifetime."

The theory argues that this is the experimental proof of the relativistic slowing-down of time of the mesons relative to time on the earth. "A meson passing through the atmosphere with a velocity close to the velocity of light is like a traveller who would have died long ago but in consequence of Lorentz's slowing-down of time lives until his arrival on the eart's surface".

Allow me to present here an explanation that is far simpler and more acceptable, and without dilatations or other relativistic encroachments. It was established that mesons disintegrate in two microseconds on the average. When moving fast, they live longer, however. But what does disintegration mean ? According to the hypothesis stated earlier, disintegration, like emission is a process restricted solely to the at-rest phases of the moving object. And since the higher the velocity, the fewer the at-rest phases, the opportunity for disintegration vanishes and the lifetime of mesons is prolonged. No relativistic dilatation of time is involved here but the stopping of emission or disintegration activity in the in-motion phases of the flight. According to the new law of motion, with growing velocity the disintegration process extends in duration from two microseconds to $2 \times 10^{-6}/\sqrt{1\text{-beta}^2}$, and could mesons ever attain the velocity of light, they would live - instead for two microseconds - without any restriction as is the case with neutrinos or photons.

It is clear that the kinetic hypothesis of L. Urbánek is the clue to surprisingly straightforward solutions of the weightiest physical problems.

Reduced frequencies of flying atoms

As early as 1938, the American physicist Ives in his endeavour to disprove the relativistic theory of time dilatation" studied the spectra of luminous atoms brought into very fast motion. But like the results of hydrogen spectra measurements made at that time by Stilwell, the results of Ives's experiments were greatly surprising. The measured frequencies of spectral lines emitted by fast flying atoms were clearly lower than those of atoms at rest, exactly as predicted by Einstein's theory.

One could hardly assume (says the book from which this excerpt is quoted) that the slowing-down of vibrations could have originated in some changes inside the atoms. The established changes of spectra could not have been produced by anything else but the difference in time flow caused by relative motion. For a flying atom the vibration lasts shorter than in the case of a spectroscope at standstill."

In this instance too the theory followed an erroneous path. The cause of diminished frequencies is not dilatation of time but - in harmony with the new emission hypothesis - the simple physical fact that emission takes place only in the at-rest phases not in the in-motion phases of a moving object. And since the number of the at-rest phases decreases with increasing velocity, the emissive activity of a flying atom decreases, too, and as a result the receiver records a lower frequency. According to the new law of motion, the frequency of a flying atom will be reduced at the ratio of $\sqrt{1-beta^2}$: 1; on the goniometric model, the reduced frequencies will be represented by a segment equalling sin alfa!

No relativistic dilation of time, is therefore involved here; the process in which emission takes place only in the at-rest phases of the moving object is logical and physically explainable.

This does away with another argument by means of which the physical theory justifies the relativistic dilatation of time.

The so-called Mössbauer effect

This is the effect which the theory usually cites as an indirect proof of time dilatation. In the experiment a rotating disk carries an emission source at its centre and an absorber for absorbing emitted radiation on its periphery. So long as the disk stands still, the emitted radiation is absorbed by the absorber; however, as soon as the disk is set to rotate at high velocity, the difference between the velocities of the source and absorber starts to manifest itself by disturbed equilibrium between emission and absorption: special detectors detect an appreciable amount of emitted radiation outside the rotating disk. This is explained by changes in frequencies, and the latter, in turn, by the relativistic dilatation of time.

Like the previous, this case evidently involves no dilatation of time, either. The gist of the matter is the new emission principle according to which emission is possible only in the at-rest phases of the moving source. And we may judge from the hypothesis that the situation is not different for absorption, either. According to the hypothesis, the different velocities of rotation of the source and absorber on one disk have the following consequences: Since the velocity of the absorber on the periphery of the rotating disk is higher than the velocity of the source at the disk centre, the numbers of the at-rest phases of the two bodies are different; and as mentioned earlier, the at-rest phases are the ones that decide about emission as well as about absorption. If emission and absorption are at equilibrium (1:1 ratio) with the disk standing still, then with rotating disk the ratio of emission to absorption will change to

$$\sqrt{1-v_1^2 / c^2} \; : \; \sqrt{1 - v_2^2 / c^2}$$

(provided the emission process is the same at rotational as at inertial motion).

Contrary to the belief of the advocates of the theory of relativity, this case again involves no dilatation of time; what we are dealing with is a modified emissive interaction during the source motion and an absorptive interaction during the absorber motion.

The motion of the perihelion of the planet Mercury

The motion of the perihelion of the planet Mercury is considered one of the basic arguments in favour of the theory of relativity, widely quoted in all textbooks and theoretical treatises on this theory.

"The planet Mercury rotates around the sun on a fairly eccentric orbit. According to Einstein, when the planet is at its perihelion, i.e. at the point in its orbit at which it is nearest to sun, time should run for it more slowly than when it is at its aphelion, i.e. at the point farthest from sun.

The opposite holds true about the measuring rods. As Einstein has pointed out such changes - so long as they exist - must manifest themselves by a lesser curvature of the orbit at the perihelion than at the aphelion. The orbit of Mercury will no longer be an ellipse with the same curvature at the two vertices but a rosette, i.e. an ellipse turning slowly in its plane round its focus, the sun".

I believe that in this case, too, the hypothesis of L. Urbánek leads to a logical solution of the problem:

The motion of Mercury's perihelion is affected by the different action of sun's gravitational field as Mercury approaches or moves away from the sun. When the planet moves away from the sun, one must eliminate from the gravitational interaction all the in-motion phases of this section of the trajectory , for there the gravitational waves and in-motion phases of Mercury's motion represent two kinetic processes at equal limit velocity c, proceeding in the same direction, hence without the possibilities of interaction. The situation is completely different when Mercury moves in the direction of the gravitational source, i.e. toward the sun. In this case the gravitational waves proceed in the opposite direction , and the gravitational interaction therefore takes place even during the in-motion phases of Mercury's rotation round the sun. This is why the gravitational interaction is more intensive on the half of the trajectory where Mercury approaches the sun, and weaker on the half of the orbit where the planet moves away from the sun. And it is just this asymmetry of the interaction that is xxx one of the basic causes of the turning of Mercury's orbit.

And how will all this be reflected in the mathematical balance according to the new law of motion ? Essentially as follows: As the planet moves away from the sun, there are in the interaction only the at-rest phases, i.e. $\sqrt{1-beta^2}$, while the all phases (at-rest as well as in-motion phases), i.e. "1", are present when it approaches the sun. The mathematical factor here is again the already familiar quantity $\sqrt{1-beta^2}$ representing the at-rest phases , or function sin alfa on the model, as Mercury moves away from the sun. The gravitational effect of the source on an approaching object and the gravitational effect on a moving-away object are at the same ratio as $1:\sqrt{1-beta^2}$.

So, once more, no relativistic dilatation of time but a physical interaction between the gravitational source and a moving object.

<u>Reduced frequencies of atoms in a gravitational field</u>

It was found that "atoms in a stronger gravitational field emit radiation with a lower frequency than in a weaker field". "All lines shift to the red end of the spectrum, to the region of reduced frequencies". The theory of relativity explains this phenomenon by claiming that "though atoms emit ever the same vibrations, time in a strong gravitational field flows more slowly, a second there is longer, and therefore even the number of vibrations - computed to our terrestrial second - is smaller than normally ".

This phenomenon, too, is considered one of the pivot arguments of the theory of relativity. Einstein even says: " Were the red shift of the spectral lines due to the effect of the gravitational potential non-existent, the general theory of relativity would be untenable".

But this phenomenon, neither, is contingent upon the dilatation of time, curvature of the time-space or other relativistic fictions. The reason for lower frequencies in a strong gravitational field is quite simple: <u>The gravitational field exerts</u>

an effect, a wholly concrete effect on the emission processes. The gravitational fields orients the elementary units of an object in the direction opposite to that in which itself propagates; to the outside observer, the vectorial result of these elementary vectors appears as an accelerated motion in the gravitational field, or as a pressure against an obstruction.

If, according to the new emission hypothesis, emission in the case of motion is possible only in the at-rest phases, it is, no doubt, equally so in the case of pressure against an obstruction. Therefore: the stronger the gravitational field, the fewer the at-rest phases and hence also the lower the frequencies of atoms. This, then, manifests itself by the red shift of the spectral lines.

As a form of matter, the gravitational field simply interacts with another form of matter and asserts its effect on the course of certain processes - in our case the emissive ones - even in atomic structures.

We are, therefore, dealing with no dilatation of time but with an emission process affected by the gravitational field.

And thus falls another of the arguments intended to prove the relativistic dilatation of time.

Cosmic flights and dilatation of time

" In the exposition of the theory of relativity consideration is frequently given to travel through cosmic space on an interplanetary ship moving with a velocity close to the velocity of light. The ship can move so fast that the Lorentz dilatation of time leads to paradoxical conclusions. A traveller who returns to the earth in the time during which a year has passed by his clock, finds that in the meantime a whole century has elapsed on the earth". In that time people on the earth had grown old or died while the cosmonaut remained quite young.

Were he, for example, one of twin children, and had he started the trip at the age of twenty, he might - according to the theory of relativity - find on his return after a year that in the menatime several decades had elapsed on the earth. He himself will be only a year older while his twin will be, say, 50 years older. - This is not an All Fools'day joke. The fact that science is more than serious so far as the dilatation of time of organisms is concerned, is borne out by authentic statements of Born, Infeld and other outstanding scientists.

The matter has a flaw, however, even according to the theory of relativity. And this flaw is euphemistically called the "paradox of time". By the principles of the theory of relativity, transformations are in fact mutual. "While an austronaut grows old more slowly for the inhabitants of the earth, the inhabitants of the earth grow old more slowly for the astronaut." What, then is the actual reality ?

It is clear to see that the variances stemming from the theory of relativity are insolvable. The idea about the dilatation of time appears as sheer fantasy. The illusion of the possibility of prolonging life is of course attractive. And the dilatation of time is undoubtedly such an illusion. The objective reality is, however, miles away. Will there never be found a way, less fantastic and more real ?

To this question mark I should like to add a note: Fast flying mesons are known to have a longer lifetime than slow mesons. Their disintegration process takes place in the at-rest phases only. In the in-motion phases the process is stopped as though preserved, petrified. This applies to inorganic objects. Were it possible to apply an analogous phenomenon to living organisms, too, then it would be feasible (judging theoretically) to prolong life for the simple reason that the disintegration processes in the in-motion phases would stop. This would be like freezing up the disintegration by motion. Unfortunately, the idea is nothing more than fantasy for the time being.

Let us return to the criticism of the principles postulated by the theory of relativity.

According to the general theory of relativity, time passes more slowly in a stronger than in a weaker gravitational field. Admitting that the solar system as a whole has come into being at one time, we will find - going by the theory of relativity - that, for example, the planet Pluto is older than the sun from which it had originated. What the theory of relativity tells us is that time on the sun flows more slowly than on any planet; therefore, planets are older than sun.

Or, take the following case: in the direction toward the centre of the earth, acceleration due to gravity approaches zero. According to the theory of relativity, time flies much faster at the centre than on the surface of the earth. What this means is that a part of a whole is older than the whole itself. As we see, there is no end to absurdities.

In yet another case, the theory of relativity claims that time stops at velocity c. How, then, does time flow in electromagnetic, gravitational, etc. systems moving with this velocity through space. Is the theory able to supply a non-evasive answer to this question ?

And one more example: A spaceship with relativistic velocity flies on the path between two fixed stars. On both fixed stars time passes equally fast. Consider the rotations of the earth round the sun to be the common clock of both the fixed stars and the rocket. The question is: Will time flow differently on on the flying roclet than on the quiescent fixed starts if both the fixed stars and the rocket will record, say, five rotations of the earth round the sun from the start to the arrival ?

Even these few examples entitle us to draw the following conclusion: Dilatation of time postulated by the theory of relativity does not portray the objective reality and seeing that it is an erroneous speculation, should be rejected.

The relativity of simultaneity

The relativity of simultaneity of two distant events represents one of the keystones on which Einstein's theory of relativity depends.

According to the theory, there exists no absolute time valid for all reference frames, for there exists no absolute reference frame to which the time data could be referred. And since in the theory of relativity a light signal with the so-called "constant velocity" becomes the coordination factor between the reference frames, the former of necessity implies also the relativity of simultaneity.

To illustrate the relativity of simultaneity, Einstein introduced the example involving a moving room with two observers, one stationed inside, the other outside the room; the task of the observers is to find whether or not light signals transmitted from a source at the centre of the room will reach the walls simultaneously. The views of the observers, based of course on the relativistic thesis of the so-called constant velocity of light, are according to Einstein as follows:

"Observer on the inside of the room: A light signal propagating from the centre of the room will reach the walls simultaneously because the walls are at equal distance from the light source and the velocity of light is the same in all directions.

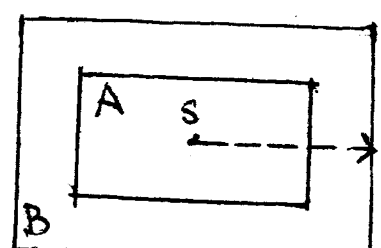
Observer on the outside of the room: What I see is a light signal propagating in all directions with the same normal velocity. One of the walls tries to recede from the light signal, while the opposite wall tries to approach it. Consequently, the receding wall will be reached by the light signal somewhat later than the wall approaching it.

Comparing the statements of the two observers we arrive at a very surprising result obviously at variance with the seemingly fixed concepts of classical physics. Two events, i.e. the two light signals that reach both walls, are simultaneous for the observer inside, and not so for the observer outside the room"(Einstein - Infeld).

Infeld then says: "Because of the relativity of time, the rhythm of clock changes, and two events simultaneous in one frame, are not simultaneous in another frame".

So far the theory.

The example of the moving room is thus to demonstrate and support the so-called relativity of simultaneity. But using the same example we may prove how the theory of relativity is deep in error. Note the following drawing:



There we have two inertial frames, A and B. Frame A moves relative to frame B which is at rest. At the instant both frames are in the concentric position, a light signal is transmitted from their centre in both directions. Frame A moves to the right in a way that the signal will reach the right-hand wall of systems A and B simultaneously. The right-hand walls of both frames will find themselves in one plane, and the signal will fall in the same common point of both frames and hence at the same instant. In conformance with the thesis of the so-called constant velocity of light, at that instant an opposite signal will reach the left-hand wall of frame A for observer A but the left-hand side wall of frame B for observer B. Accordingly, the same ray, the same optical material process, the same transport of energy and mass should reach the left-hand wall of frame B even though at that instant it could have - from the point of view of observer A - reached only the left-hand wall of frame A. Hence the detection apparatus of observer A would detect nothing on the left-hand wall of frame B, while the apparatus of observer B would detect there the incidence of the signal. If we associate with the incidence of the signal, say, extinction of some organism (microbe), then at the same instant the organism would live for one observer, and not live for the other. It is clear that we are facing here an unbridgeable discord between the relativistic postulate and actual reality. There exists no physical law that would make it possible for a certain phenomenon at the same place and instant to exist for one and not to exist for another observer. The assertion of the theory of relativity concerning the relativity of simultaneity is nothing but mere speculation, without any support in objective reality. The fact that a process was realized at a definite time and definite place in space is an actual reality valid for all reference frames irrespective of the signalization of this event from one system to another. The fact that, say, a living organism came into being or became extinct must hold for all reference frames, and transfers of signals, projections, etc. can change nothing about it.

To the question whether there can really exist something non-simultaneous in the universe, we may give the following unequivocal answer: Objectively, non-simultaneity of anything in nature has never existed and cannot exist. The whole world exists only in the sequence of simultaneities: the past and the future are merely fictitious denotations of something that had really existed or will exist. Actually, however, there has always existed but the present. Therefore everything that is happening is simultaneous. There exist next one to another no process that just "is" with a process that "is no longer" or a process that "will" be. There exists no instant of the present that would not apply simultaneously to the whole material world. And since the present, i.e. the "instantaneous state of the world" is common to all objective reality, one cannot speak about time passing differently in different parts of this world entity. Everything that is actually happening in the universe is the present. No past event can proceed next to a present event, nor present event simultaneous with a future one. There always proceeds in the universe only that which is of the present, and this is of necessity common to the whole universe because it is an adequate expression of the existence of the universe as a whole, a portrait of the "instantaneous state of the world". It is of no importance whether or not this "instantaneous state" can be set down by some mechanisms. What we see is not an image expressing the state of one and the same instant, but an image of the most diverse states, depending on the path the signals had to travel. Thus, for example we see Sun as it was about 8 minutes ago, the stars the way they have existed even some millions of years ago. It is, therefore, possible that we are still observing some star, that for other cosmic systems became extinct or stopped to exist a long time ago. But signals about its extinction will not reach us until in the future. It is, therefore, necessary to distinguish the existence of an object "in origine" from its signal projection. As we see this has absolutely nothing in common with the relativistic non-simultaneity, however.

Space

The theory of relativity disclaims the existence of an absolute space. According to it, the intervals of space are not invariable, absolute but on the contrary, variable, relative and dependent on the motion of the object and the chosen reference frame. It follows from the Lorentz transformations that " a moving rod contracts in the direction of motion and this contraction increases with growing velocity. The ratio at which it occurs is $\sqrt{1-beta^2}$: 1. Accordingly, "one and the same thing will be differently large relative to differently moving frames". By the theory of relativity, the path through which the moving object has passed, contracts, too. The space interval s are thus dependent on the mutual motion of the reference objects. It should be stressed, however, that from Einstein's point of view the contraction of dimensions is mutual. " A moving train is contratced relative to the rails and vice versa, the rails are contracted relative to the train".

The theory usually speaks of the contraction of lengths. Actually, however, the concept "length" is but an abstraction. No isolated lengths are found in nature; only volumes exist in nature. Strictly speaking, the contraction of length is an abstraction , without correspondence to real facts. Contraction could, therefore, be referred to volume units only. At velocity c this would mean - by the theory of relativity - vanishing of the volume and hence also of mass - a clearly absurd result. Yet such a result follows from relativistic balances. The same theory, on the other hand, contains a formula stating that the mass of a body increases with velocity, and at velocity c would attain infinite values. A body whose volume has changed to zero at velocity c would at the same time have an infinitely large mass. As can be seen, speculations disseminated by the x theory of relativity are at variance not only with logic but obviously, with the objective reality of the physical world as well.

In the considerations concerning space one always runs into the following essential question: Does absolute space exist as a privileged reference frame ? A frame that is at absolute rest ?

The attitude of the theory is unequivocal : no.

A number of arguments, clear and incontestable bear out a positive answer, namely that such a space exists. Thus, for example, the motion of an electromagneti wave with velocity c proceeds just relative to the absolute space, that is to say, to the absolute reference frame. Inertia of bodies is another argument testifying in favour of the absolutness of space. Inertial motions are absolute motions that can be realimed only relative to the absolute space. If we know the velocity of propagation of electromagnetic waves in space, the knowledge gives us at the same time the possibility of measuring the absolute space. One can measure even with mass in motion. "It is clear that the recognition of absolute motion results in the recognition of absolute rest since the absolute space simultaneously represents a reference space that is at absolute rest".

The rest of space and the motion of matter turn out as dialectic antitheses existing in indissoluble unity. The opposite to motion is rest. Without this antithesis motion would be unthinkable. Motion, therefore, presupposes its opposite, i.e.

absolute rest. An the objective image of this absolute rest is the rest of the absolute space.

Moving matter and immobile space form a dialectic, indissoluble unity of antitheses. There is no space without matter, nor matter without space. Without this oppositeness of rest and motion it would be impossible to imagine the existence of matter at all. Space is the indispensable condition for the existence of matter. All motions and changes can be realized only in space.

The general theory of relativity connects space with time, creates a uniform concept "time-space" and argues that this "time-space " curves by the effect of the gravitational field. I quote: "Einstein has identified gravitation, curving geodesics of moving bodies with the curvature of time-space".

What we meet with here are but speculations stemming from modifications of mathematical balances rather than from facts reflecting actual reality. One can hardly identify the gravitational field with space or time-space. The former is but one of force fields existing in space. In that space there exist also other fields, e.g. electromagnetic, nuclear, meson fields, etc. The theory of relativity, however, assigns far-reaching effects on space and time to the gravitational fields alone. This, too, contains a lot of illogicality and inconsistency .

In real material neture the concept "time-space" has no grounds. Thus, for example, while space continues without change, time forever arises and vanishes. Space has three dimensions and can be moved in; time, on the other hand, has but one dimension and one cannot move in it so that one could step into the past and then return to the present. Or: space exists as a whole and can be divided in most diverse portions. Time, however, exists only as an elementary instant of the present, invariable and indivisible.

The principle of relativity

"The principle of relativity is one of the basic ideas of contemporary physics". " It forms - together with the principle oc constant velocity of light .. the basis of the theory of relativity".

The content of the principle of relativity consists essentially in the assertion that in no way, without relation to another frame can one decide whether the frame in question is in motion or at rest. Neither can one - not even from the relation to the other frame, decide which of the two frames is in motion and which at rest.

We may, therefore ask: What are we dealing with - a law that can never be eliminated, or a lack of knowledge of the actual state of affairs ? Of primary importance in this respect is the answer to the question: Does there exist an objective difference between the physical states of rest and translational motion ? If it does, then the principle of relativity is only a reflection of the inadequate level of science and engineering which are not capable of differentiating between these two qualitatively different physical states.

The assertion that it is impossible to distinguish whether an object is at rest or in motion cannot clearly hold true about the radiation forms of matter. They are after all known to move in vacuum with velocity c. One cannot imagine, for example, a light ray at rest. Evidently, the principle of relativity does not apply to all forms of matter.

Let us carry our considerations a step further: From the mere fact that two bodies move closer or away one from another one can judge that that motion necessarily proceeds in space and therefore relative to that space, with at least one of the bodies moving relative to space. The motion of that body though established from the relation to the other object. has not coml into being from that relation.

And if we admit the idea of a qualitative difference between rest and motion, we cannot reject the idea that this difference has to manifest itself in some way also in the inner structure of the frames. To defend the principle of relativity would be like defending the principle of our inability to perceive two qualitatively different states. If it is possible - via material indices - to ascertain various physical quantities, such as temperature, gravitational intensity, etc., it would be illogical to refuse in principle the possibility of distinguishing, from the matter, internal state, of the body whether the body is at rest or in translational motion.

From the point of view of the kineton hypothesis, translational motion of a body in space is nothing but an expression of the orientation of its elementary units of motion; the larger the number of elementary units oriented in a direction, the higher the velocity of the body in the absolute space. Only a body whose elementary units have zero resultant can be considered at rest relative to the absolute space. It is the resultant vectors given by the elementary vectors of the body that decide whether the body is at rest or in motion. Accordingly, one cannot arbitrarily assert which of two bodies is in motion, whether body A or body B. The motion of the body and the magnitude of its velocity follows from the vectorial results of body's elementary units.

Viewed from this angle, the principle of relativity appears a physical error.

Constant velocity of light

By the theory of relativity the velocity of light is the same in all inertial frames. It is claimed, for example, that light travelling to the earth from a star has always the same velocity regardless whether the star moves away from or toward the earth. Accordingly, light falls on the earth always with the same velocity, velocity c. It makes no difference whether the observer moves toward or away from the light ray.

"Constant" velocity of light is not to be understood to mean the velocity of light relative to the absolute space; it is the relative velocity with respect to the most diverse inertial objects. To put it clearly: what is involved here is not the motion of light relative to space but the moving away or to of two objects one of which is light. By the theory, this moving to or away is to be done at constant, invariable velocity c , and not at velocity c+v or c-v, as would reasonably follow from the classical theorem of velocity addition. If we have a light ray with velocity c on one side, and an object with velocity v on the other, these two material systems do not approach one another with velocity c+v or c-v, but always with velocity c only. "The velocity of light plus the velocity of the system is again equal to the velocity of light only" says Infeld, one of Einstein's fellow workers.

And what are the reasons given for this truly shocking assertion ? They resort to the already familiar jugglery: If in the objectively existing world light propagates to all systems with the same velocity, irrespective of their mutual motion, this is possible only because the passing of time of each system is changed for the remaining systems. The change is a definite one - to even out the differences in velocities caused by different motions of the bodies."

This principle is of primary significance for the theory of relativity. It is quite the cornerstone of the special theory of relativity. It seems, however, that this cornerstone is of clay, not of steel. In the real physical world one can find no "constant" velocity of light. Relative to the absolute space, the velocity of light is c, the absolute velocity of light; the velocity of light relative to other objects is either c+v or c-v, wholly in conformity with the rule of addition of velocities. This is borne out by a number of astronomical motions and phenomena. The well-known Römer's experiment, the Doppler effect as applied to optical process, and finally every one of the radio location processes based on just the opposite principle testify to the absurdity of the relativistic principle. Therefore we feel free to state that the law of so-called constant velocity of light is one of the grossest insinuations physical science has ever commited.

Light travels a shorter distance in a shorter time, a longer distance in a proportionally longer time, in full conforfance with the equation $s = c\ t$. No paradox, no anomaly, no dilatation of time !

With a straight face the theory taxes us also with the following example: Point A is at rest, point B in motion. At the instant the two points come to the same level, electromagnetic signals are sent from both. At the instant of origin, the two signals thus have a common centre. After a second, the signal forms a spherical wave front with radius c. The theory argues that the centre of this spherical wave front is not the point in space at which emission took place, but a moving source. According to the theory of relativity, two signals with a common centre at origin, form non-concentric spherical wave fronts.

We would be hard put to find such an egregious folly in nature. Light, once emitted by a source, propagates through space independently with constant velocity c , with no regard to further motion of the source or receiver. If light was emitted at a definite point of space, then this point becomes the centre of spehrical wave fronts by means of which light propagates through space. This point does not move with the source, and this is why the propagation of light once emitted is in no way affected by the motion of the source.

Let us carry out the following mental experiment: Material object A is 300 000 km away from light source S . Were object A at rest, a light ray would reach and illuminate it in one second. What will happen if object A moves away from the source of light with a velocity of, say, 100 000 km/sec ? After one second, will the flash of light illuminate object A which in the meantime has moved 100 000 km farther away from the source and is therefore out of reach of the spherical wave front with radius c ? If after one second, object A will not be illuminated by the ray, it means that the front of the light ray moves relative to the moving-away object with a relative velocity of 300 000 - 100 000 = 200 000 km/sec. This result is, of course, at variance with the relativistic postulate.

Should a relativistic theoretician claim that after one second the flash of light will illuminate object A even though the latter has moved 100 000 km out of reach of the spherical wave front, how will he explain the optical material interaction (photons impinging on the body) when the body is objectively out of reach of such an interaction ? The absurdity of the relativistic postulate is also proved by the example quoted in the section on the relativity of simultaneity. A signal has reached the right-hand walls at the same time (there are two systems here, A and B, one at rest, the other moving). According to the principle of constant velocity of light, the opposite signal must have reached the left-hand walls of both systems at the same instant. The opinions of the two observers will differ, however. The observer in system A will claim that the ray has reached only the left-hand wall of system A, while observer B will take it for granted that the ray has arrived to the left-hand wall of system B. At the same place and instant, one of the observers will claim something different than the other. If the incidence of the ray on the left-hand wall of system B were associated with, for example, the existence of some bacteria, then at one and the same instant observer A will argue that the bacteria is living while observer B will claim that it has been annihilated. We can rightly pose the question: can a physical or a biological phenomenon actually exist for one and not exist for the other observer even though both evaluate the situation from the same place and at the same instant ? Are there two material worlds in existence, one for observer A, the other for observer B ?

It is clear to see that the inconsistency contained in the postulate is unsurmountable and one at variance with the fundamental principles of the motion of matter in space. The principle of constant velocity of light should, therefore, be rejected.

Constant velocity of light and the Doppler effect

The theory says, for example: " It is an experimentally proven fact that in motion in the direction toward a star, the particles of its light fall on us "more intensively", are "harder", "more in the violet range", "more efficient" whereas when the earth moves away from the star, the impacts of light particles are weaker as though the particles were "lighter", "more in the red region". "Stars which the earth in its rotation round the sun flies to meet, have somewhat higher frequencies of light.

One would expect that a similar difference would be found when measuring the velocity of light". "According to the physical theories the velocity of impingent light remains absolutely unvaried, however". Thus the theory.

Let us analyze the objective physical reality: If an object moves toward light, the impingement of rays is "harder", and contrarywise, if it moves away from light, the impingement is "softer". It is evident that this phenomenon cannot be based on anything else but a larger or a smaller amount of electromagnetic matter per unit of time. What this statement implies is that the relative velocity of light and receiver varies, that these two systems move to or away from one another with velocity c+v or c-v ! Here we have a material proof of varying relative velocity of light and thus also a proof against the relativistic postulate of constant velocity of light. The invariability of relative velocities of light would also be at profound variance with the law of conservation of mass and energy: in cases of this sort higher frequencies mean higher reception of vibrations per unit of time, which in the material balance means proportionally higher quantum of electromagnetic energy(matter)received by the receiver. If the distance between star and earth varies, the receiver will absorb more electromagnetic matter when the two bodies come closer together than when the two bodies are at relative rest. The higher frequencies recorded by the receiver are then an optical image of this increased shift of electromagnetic matter. The increase in relative velocity is thus in causal connection with increased transfer of matter in unit of time and with a change in the respective frequencies.

Therefore, we feel free to state that the relative velocity of light is not constant as asserted by the theory of relativity ; its values are c+v and c-v, respectively.

Constant velocity of light and Römer's experiment

As early as the seventeenth century, Danish astronomer Römer observed that "the time between two successive eclipses of Jupiter's moon appeared shorter when the Earth was approaching the planet (the path of light became shorter) and longer when it moved away from the planet". Römer explained this phenomenon by that light needs longer time for reaching us when the Earth moves away from Jupiter, and shorter time when it approaches the planet. From the observed differences he then computed the velocity of light.

As Römer's experiment clearly indicates, light travels longer distances in longer time and shorter distances in proportionally shorter time. Exactly as stated by equation s = c t . Were the postulate of the theory of relativity about the so-called constant velocity of light true, Römer's experiment could not have been successful. One could detect no retardation or acceleration of light signals arriving to the earth from Jupiter's region. Reality shows that what holds good is just the opposite to what is postulated by the theory of relativity. The moving-away earth bears an effect on the retardation of light signal; this means that the relative velocity of such a signal is not c but c-v. And only this incontestable physical fact has enabled the scientists to determine the velocity of light in cosmic space. As a matter of fact, we know of no case in astronomy in which light would behave as paradoxically as predicted by the theory of relativity. Dilatation of time or contraction of lengths are nowhere to be found !

Constant velocity of light and radio-location

Not only light but also every electromagnetic wave and hence a radio wave, too, moves in vacuum with velocity c. This is why the "constant" velocity of an electromagnetic wave can readily be verified by means of radio-signals. Should, for example, radio-signals transmitted from the earth and automatically reflected from a moving-away cosmic rocket recorded in ever longer intervals, there is no doubt about the prolongation of the intervals being caused by the moving-away of the rocket from the earth. And this, of course, is the proof positive of the fact that the relative velocity of a radio wave with respect to the source is not c but c-v ! The postulate of constant velocity of light, therefore, is nothing but a hoax since it is at variance with actual reality.

Were the velocity of light constant - as claimed by the theory of relativity - would it be at all possible to determine whether or not something moves relative to light (electromagnetic wave)? As a matter of fact, radio-location is feasible only because of the principle that the relative velocity of an electromagnetic wave with respect to a moving away or approaching object is not constant but variable, that is to say c+v or c-v ! Only the variability of relative velocities of signal and body makes it possible to determine motion and location of radar targets. Confronted with these arguments, the theory pretends to be deaf and blind.

Further objections

If the theory claims that light propagates in spherical wave fronts, it cannot deny that the front of one ray moves away from the front of the opposite flying ray with relative velocity c , not 2c.

One cannot doubt, either, that rays emitted from sources 600 000 km apart will meet mid-way, i.e. in one second, when moving against one another. Their mutual velocity, therefore, is not 300 000 km/sec but 600 000 km/sec. To deny this fact is to face reality blindfolded.

The upper limit for the transfer of energy (matter) in space is velocity c. This undoubtedly is correct. What is incorrect is that the theory of relativity applies this even to the mutual velocity of objects moving in opposite directions, e.g. to the mutual velocity of two opposite-oriented rays.

The many arguments testifying against the relativistic postulate of constant velocity of light, which we could quote, all point to the unambiguous conclusion that the postulate is an egregious fancy.

Gravitation

What, in fact, is gravitation (attraction) ? The usual definition of gravitation states that it is "an ability of bodies to produce gravitational fields and at the same time be subjected to the action of gravitational fields". It is thus "a property of material bodies manifested by mutual attraction".

So far, science knows nothing positive about the nature proper of gravitation. Assertions such as that gravitation is an ability of matter "to produce gravitational fields" and an ability "to start moving" in a gravitational field, are merely of a descriptive character and tell us nothing about the mechanisms of gravitation.

How can one, however, explain the fact that gravitational fields propagate in one direction while bodies that find themselves in such a gravitational field start to move in just the opposite direction ? I believe that the following explanation is logically acceptable: Every material body with at-rest matter is a source of gravitational radiation. A gravitational field propagates in the surrounding space in all directions as spherical wave fronts. The quanta of a gravitational field are the hypothetical "gravitons". We can assume that the gratons have a specific ability to orient the elementary units (kinetons) with which they interact on their way through space, in the direction opposite to that in which they themselves propagate, that is to say, in the direction toward the source of gravitation. According to this, the ability of a body "to start moving in a gravitational field" is nothing else but the orienting of the elementary units of an object toward the source of gravitation. We are therefore dealing with no "attraction" of one body by another but with a change of orientation of the body's elementary motional units. And a change of orientation also means a change of translational motion of the body. There is no force here that would "attract" other objects. All that is here are emitted signals that orient the elementary units of motion in other objects toward the source of gravitation. Hence gravitation is a sort of telecontrol of internal mechanisms of motion of remote bodies, performed by means of gravitational field quanta, the so-called gravitons. The motion of a body thus controlled is then given by the vectorial result of its elementary units of motion (kinetons). The higher the number of oriented "kinetons" the faster a body moves, the faster it "falls".

In theory, the opinions regarding the nature of the gravitational field differ one from another. They are those that consider the gravitational field a form of matter and argue that the gravitational field is material, while others regard the gravitational field as essentially geometric, an expression of the geometric properties of "time-space". The first view forms the basis of Newton's law of gravitation, the second of Einstein's gravitational theory as expressed by the general theory of relativity. According to the latter, motion of the planets of the solar system is not caused by the gravitation force of the sun but by "the curvature of time-space".

If, however, we adhere to the primary dialectic idea that wherever there is motion there must also be the material carrier of this motion, it is not difficult to answer the question whether or not the gravitational field is material. In the material world there exists no motion without matter. Consequently, a gravitational field - same as e.g. an electromagnetic or some other physical field, is material.

The gravitational field causes no curving of time-space, and no changed metrics have the property of making an inertial motion (rest) from the acceleration of gravity, as postulated by the theory of relativity. Nature shows us - and in a very lapidary manner at that - a far simpler way: Matter produces a gravitational field and this field interacts with other material objects. The result of such an interaction is an accelerated motion of the body in the gravitational field.

Is gravitation a general property of matter ?

It is said about gravitation that it is inherent to every form of matter. "All bodies and all force fields, simply everything that has matter and energy, form gravitational fields. " But can this be claimed without any doubts ? Can, for example, an electromagnetic wave emit gravitons or form a gravitational field ? By what kind of mechanism could it realise such a function when itself moves with velocity c which must not be exceeded ? And in this case emission would assume a velocity higher than c, i.e. a superlimit velocity ! This is impossible, however. We may, therefore, suppose that in matters moving with translational velocity c emission is absolutely excluded.

Or: How can an electromagnetic wave be accelerated by the gravitational field when the gravitational field moves in space with the same velocity as the wave itself ? From this standpoint, too, we can suppose that gravitation is associated only with the at-rest form of matter, and impossible wherever radiation, force fields, that is to say matter in the radiation form is involved. Gravitational interaction (emission of gravitational waves) had not probably come into being until at a higher stage of matter history, i.e. with the origin of substance. Only matter in the at-rest form starts substance exchange with its neighbourhood by gravitational irradiation. So long as matter is in the form of a field moving with velocity c, it can emit nothing.

It is, therefore, possible, to formulate the physical assumption according to which gravitation is not a general property of all forms of matter. Manifestations of gravitation do not come into play until on the level of "at-rest" matters, while the radiation forms of matter (fields) are neither subjected to the gravitational effects of other bodies, nor themselves produce gravitational fields.

Different gravitation on the equator and poles

It has been found by measurements that attraction is smaller on the equator than on the poles, or in other words, that gravitation grows in the direction from the equator to the poles. Theory explains this fact by claiming that the earth is flattened on the poles, that is to say that the distance from the centre of the earth is smaller at the poles than at the equator. According to theory, another cause of this phenomena may be found in the centrifugal force of the earth displaying its effect on the "weight" of bodies particularly on the equator. An estimate of the quantity of those effects is naturally a matter of mathematical balances; I should like to but point out another factor which the new emission hypothesis propounded in this paper should not fail to take into consideration.

According to this hypothesis, emission - be it gravitational or of some other kind - can take place only in the at-rest, never in the in-motion phases of the moving source. This is the reason why during the earth's rotation round its axis there are more at-rest phases at the poles which are comparatively at rest than at the equator, and why the gravitational emission there is more intensive. The reason is wholly analogous to that mentioned in connection with Mössbauer's experiment involving different emissive (and absorptive) activity on the periphery (analogy of the equator) and at the centre (analogy of quiescent poles) of a rotating disk. By this hypothesis the acceleration due to gravity should be less on the equator than at the poles even were the earth perfectly spherical.

According to all indications, the effect of earth's rotation on the emission of gravitational quanta acts in yet another direction. Due to the effect of earth's rotation round its axis the quantum of emitted gravitons per unit time falls to a larger space on the equator than at the poles. It can namely be assumed that during the rotation of the source there takes place a dissemination of gravitational quanta, which diminishes from the equator to the poles. This circumstance, too, has an effect on the intensity of the gravitational field. At the poles, where the dissemination of gravitons is at minimum, the intensity of the gravitational field is maximum.

Does a body fall to the earth with the velocity with which it is thrown up ?

The physical theory asserts that " a thrown body falls to the earth with the velocity with which it has left it". Consider, however: In the "upward" motion a body moves in the same direction as the propagating gravitational waves which can interact with a moving object only in the object's at-rest phases. When the two move in one direction, the in-motion phases of the object and the in-motion phases of the gravitational field are at relative rest and no interaction takes place. The situation is quite different during the return motion of the thrown-up object, i.e. during its free fall. In this case the object moves against the direction of the gravitational field, and interaction, therefore, takes place in both the at-rest and in-motion phases. Consequently, the gravitational field has more opportunities to assert its effect, and this is manifested by the body having a higher velocity in the descent than in the ascent. On the same principle rests the explanation of the familiar motion of Mercury's perihelion. During the motion of this planet round the sun, the gravitational inetraction is more intensive on one half of the orbit than on the other. As the planet moves away from the sun, the gravitational interaction is realized only in the in-rest phases, while when the planet approaches the sun, it is relaized in both the at rest and in-motion phases. And this is just the reason of the well-known turning of Mercury's orbit.

The conclusion may generally be formulated as follows:

During motion in one direction, the gravitational field affects a body only in the body's at-rest phases. During motion in opposite directions, it affects it in both the at-rest and in-motion phases.

Newton's law of gravitation

"According to Newton's law of general gravitation, every two bodies attract one another by a force directly proportional to the sum of their masses and inversely proportional to the square of their distances":

$$F = k\, m_1 m_2 / r^2$$

Newton's law of gravitation is built on the idea that the two material bodies are under the effect of mutual action to which applies the law of action and reaction. Accordingly, the bodies produce a uniform, common gravitational field and act one on another by force F which - according to the law of action and reaction - is uniform, of equal magnitude but opposite signs. As the theory puts it: "The moon rotating round the earth is acted upon by a centripetal, the earth by a centrifugal force".

But this is a gross physical error. Incontestably, the decisive factors in gravitational interaction are the mass of the gravitational source manifested by the intensity of the gravitational field, and the distance of the source from the object being accelerated. The intensity of the gravitational field is thus given by the mass of the source of gravitation and distance r. This fixes the basic factors decisive for gravitational interaction. It is then immaterial whether the body that finds itself in such a gravitational field has mass m_1, m_2 or m_x, since this causes no change in the gravitational intensity of the source. The source produces its own gravitational field without anything but the quantity of its own mass playing a decisive role. It is essentially immaterial for the intensity of this field whether any and what kind of, objects will find themselves in the emitted gravitational field. The gravitational field of a definite object is thus an independent physical factor having its roots in the mass of the object in question. The gravitational force is a vector; and this is the further reason why one cannot speak of a common force (F) in the sense defined by Newton's law of gravitation.

What is involved in gravitational interaction between two objects are two separate, specific gravitational fields of different intensities (depending on the quantity of the masses) and in different directions. Forces acting in those two directions are not identical as would follow from the law of action and reaction, but different, proportional to the intensity of the gravitational field of each of the objects. Therefore, there are no grounds here for the application of Newton's third law of action and reaction. The theory is in error if it speaks of centrifugal or centripetal force in connection with these interactions. No forces of this kind exist. The rotational motion of the moon round the earth is caused by a gravitational field having the character of a signal field, changing the orientation of the elementary motional units of moon's matter. Nothing but this orientation is the immediate cause of moon's motion in the cosmic space.

Neither can one claim that force (F) by which two bodies of different masses act one on another is the same. The gravitational effects of the bodies are wholly independent, contingent to the intensities of their gravitational fields which in turn are proportional to the masses. Apart from this, the gravitational fields between two objects propagate in opposite directions so one can hardly speak of a uniform gravitational field or make the effects of the gravitational fields mutual. Newton's law of gravitation could be simplified as follows: The acceleration of gravity of an object is directly proportional to the mass of the source of gravitation and inversely proportional to the square of the distance from this source.

It may be assumed from the viewpoint of the kineton hypothesis, however, that there exists some regular relation between the number of gravitons and the number of units oriented per unit time. This, however, leads to the conclusion that acceleration in a gravitational field is also dependent on the mass density of the object being accelerated. A gravitational field of a given intensity needs a longer time for interaction with an object whose mass density is, say, million times that of another body, though both bodies have the same volume and are at the same distance from the source of gravitation.

The gravitational field and a ray of light

By identifying the gravitational field with the metrics of time-space, Einstein was of necessity compelled to also admit the effect of this metrics on the behaviour, velocity and direction of rays of light. He decided to take the behaviour of a ray of light in the gravitational field of the sun for a proof of his theoretical conclusions. The expeditions charged with the observations of this phenomenon, found that in the proximity of the sun a ray of light is deflected from its course. And this result is considered one of the fundamental arguments of the general theory of relativity.

Let us examine the phenomenon from other aspects:

It is a well-known empirical fact that a ray of light passing from one medium to another, undergoes refraction. If it passes from a thinner to a denser medium, it bends to the normal, if from a denser to a thinner medium, away from the normal. We must not overlook the fact that for a ray of light travelling from a star, the gravitational field of the sun, various corpuscular radiations, radiation matters, etc. which the sun emits to its surroundings represent just such a denser medium. Can the physical theory exclude the possibility of no refraction taking place in such a medium ? In the negative case, the deflection of a ray of light could be interpreted as light refraction in passage through dense layers in the vicinity of the sun. And we do not refer solely to streams of gravitons but to streams of corpuscular particles, dense radiation emanations, electron and ion radiations, etc.

This problem may be looked into yet from another angle:

There is no doubt that a ray of light passing through the dense layers of sun's atmosphere is decelerated by such a medium because, as the theory states, "in an optically denser medium a ray of light travels more slowly". If the velocity of a ray of light is reduced in the dense layers of the sun's envelope, so that it is less than c , it must contain also the at-rest phases next to the in-motion ones. And in the at-rest phases interaction is possible even with an electromagnetic wave which after being decelerated already contains - with all probability - some nuclei of the at-rest matter and those are the ones that yield to the gravitational interaction. Therefore we feel free to state: If a ray of light is deflected in the gravitational field of the sun, it is very likely that its velocity has been reduced in the dense layers of sun's atmoshere and the gravitational interaction thus made possible.

Equivalence

A - Equivalence of inertial mass and gravitational mass

As it is well known, the amount of matter in a body can be measured on the basis of inertial properties or on the basis of gravitational properties. And this is why the following two concepts have come into being: inertial mass - if the inertial properties were considered in the measurement, and gravitational mass if the measurement was made according to the gravitational properties. One way or the other, the results are always the same.

Actually, there exists no inertial mass nor gravitational mass. All that is involved are two measuring methods utilising two different properties of matter proportional to its quantity: inertia and gravitation. However, Einstein considers the equivalence of the two masses "one of the most important clues of the development of the so-called general theory of relativity". The reason for this will become clear from, for example, the following question:

Do bodies of different masses fall with equal acceleration ?

It was believed in the antiquity that heavier bodies fall faster and lighter bodies more slowly toward the earth. However, Galileo's experiments gave a proof positive that bodies no matter what their weight fall to the earth with equal acceleration regardless of their masses. This view was taken over by Newton and in modern physics by Einstein for his theory of relativity. The view prevailing in the theory is that "all bodies fall with the same acceleration in the field of earth's gravity". Their free fall is independent of the inertial mass." According to Newton's idea, two opposite forces compete during free fall: the gravitational force that pulls the body downwards depends on the body's gravitational mass, and the inertial resistance dependent on the inertial mass. If all bodies fall with the same velocity though differently heavy, it is clear that the inertial mass must change from one body to another exactly the same as does the gravitational mass". Einstein takes over Newton's idea but formulates it as follows: Acceleration of a falling body increases proportional to its gravitational mass and diminishes proportional to the inertial mass. Since all falling bodies experience the same constant acceleration, the two masses must be the same".

As we see the theory of relativity starts out from Newton's idea according to which the same falling of bodies in the gravitational field can be explained by cooperation of a sort of the gravitational mass and inertial mass; and since the bodies fall with equal acceleration it is inferred that the gravitational and the inertial masses must be the same, too.

Nature, however, does not choose such complicated ways. The objective reality is far simpler. Why then do bodies of differrent masses fall to the earth with essentially the same acceleration ? The answer is quite simple: The bodies share in the strength of the gravitational field according to their masses. Or, putting it differently, bodies with different masses will move with equal acceleration whenever the force that causes their acceleration is proportional to the magnitude of their masses. And here lies the basic cause of equal acceleration of bodies in the gravitational field. To appeal to some special actions of the inertial mass to even out what the gravitational mass has perpetrated, sounds like an echo of the ancient and medieval times.

Summing it up we may state: In a gravitational field every body shares in the strength of the gravitational field in proportion to the quantity of its mass. This is the only reason why bodies of different masses fall with equal acceleration in the gravitational field.

Let us now take a closer look at Einstein's formula according to which "the acceleration of a falling body increases proportional to the gravitational mass and diminishes with the inertial mass". The author speaks here of a growth of acceleration of a falling body. But how could a body pass from rest to accelerated motion if from the very beginning the acceleration grew proportional to the gravitational mass and diminished in the same way with the inertial mass ? It is clear that under such conditions there would be no acceleration at all.

By Einstein's words the acceleration is to grow proportional to the gravitational mass. According to the general physical laws, acceleration does not grow with mass (and this means that with the gravitational one neither). The gravitational acceleration does not grow with the gravitational mass of falling bodies but grows by the increase in intensity of the gravitational field ! What Einstein's formula implicitly infers is that - were it not for the compensating action of the inertial mass - bodies would fall in the gravitational field with unequal acceleration, that is to say bodies with larger masses faster (!) and bodies with lesser masses more slowly. Surely a view that would look well in antiquity. The reality is completely different, however: Every object shares in the energy of the gravitational field in which it finds itself , to the extent depending on its mass. It is not the acceleration that grows with the gravitational mass, as claimed by Einstein, but the force with which a body is attracted to the earth. This force is proportional to the quantity of mass, and this is the only reason why bodies can be claimed to fall with equal acceleration. Thus, for example, a body with a mass of 1 kg is acted upon by a force equivalent to 1 kg, a body with a mass of 10 kg, by a force equivalent to 10 kg. What, then, remains there for the action of the inertial mass to which Einstein appeals ? If the acceleration grew at the same rate at which it simultaneously diminishes, there could be no acceleration. The relativistic theory is clearly at variance with objective reality. But even the mathematical proof demonstrating that bodies fall to the earth with equal acceleration, is a mathematical camouflage rather than a convincing argument. Judge for yourselves: According to the second law of Newton's mechanics, acceleration $a = F/m$. When dealing with the acceleration of gravity, we substitute for F the value given by Newton's law of gravitation, i.e.

$F = m\,M/r^2$ and get

$$a = \frac{m \cdot M}{m \cdot r^2} = \frac{M}{r^2}$$

For the mass in the numerator one takes the gravitational mass, for that in the denominator the inertial mass; since the two masses are the same, they cancel out. This is then the "mathematical"proof that acceleration depends on but the intensity of the gravitational field, i.e. m/r^2. After cancellation we get the same result, i.e. $a = M/r^2$ in all cases. But this is argumentation built on sand. There is no doubt that in the equation $a = F/m$ "a" can remain constant only on the assumption that the right-hand side of the equation, too, will remain unvaried. If m grows, force F ,too, must grow proportionally. By cancelling out the masses as indicated above, one deprives the balance of the true physical content of the gravitational process in which force F must necessarily grow with growing mass. The mass of attracted bodies disappears from the computation balance, and the value that remains - determined by the mass of the accelerating object and the distance between it and the object being accelerated - is the intensity of the gravitational field at a certain distance. The theory clearly overlooks the fact that to cancel out the masses in the formula means to actually reduce all the masses to the elementary unit of mass (m=1), and this is why the result is the same in all cases. Consequently, the mathematical procedure referred to above is not a proof but a pseudo-proof valid for nothing else but the elementary unit of mass.

Bodies do fall differently !

The thesis that the acceleration of gravity is independent of the mass of bodies, is in the theory considered incontestable. Let us proceed a step further: A gravitational source, M, emits gravitational waves to space and thus produces a gravitational field of a definite intensity. Consequently, a definite number of gravitons passes through a definite volume of space per unit time. And here is the question that comes to mind in this connection: Is'nt there a difference whether a body of mass "m" or one of mass "1000 m" is placed in such a quantum of space ? Is it possible to authoritatively state that the same amount of gravitons will in the same time unit affect both object m and an object 1000 times more material ?

Allowing that the gravitational field needs more time for interaction with a far higher number of elementary units, then- strictly speaking - bodies cannot fall with equal acceleration. In such a case bodies with larger masses would, of course, fall more slowly - not faster (as implied by the relativistic argumentation) for the simple reason that a longer time is required for a higher number of elementary interactions. A gravitational field of a given intensity will, no doubt, finish reacting with say a sphere of mass "m" sooner than with one of a density of 10^7 m. In principle we can state this: Bodies of different masses fall in a gravitational field at different rates: bodies of larger masses more slowly, bodies of lesser masses faster.

Mechanism of the action of gravity

Unlike amechanical force, a gravitational field does not act on a place of the object surface but penetrates inside the inner structures of matter and interacts directly with the elementary units of matter. This is why it seems virtually immaterial whether a body has a higher or lower number of such elementary units, that is to say whether it is of a larger or a lesser mass. Since the earth's gravity acts equally on all such elementary particles, all elementary particles (and hence also all bodies) fall to the earth with virtually equal acceleration. A gravitational field knows nothing but the elementary unit, and it is with this unit that it reacts. The crux of the problem of why do bodies - regardless of their masses - fall with essentially equal acceleration lies not in the so-called principle of equivalence postulated by the theory of relativity but in the gravitational field acting direct on the elementary units of matter.

B - Equivalence of acceleration and gravity

This Einstein's principle contains the assertion that the effects of acceleration can in no way be distinguished from the effects of gravity. It is claimed that "an accelerated motion causes the same dynamic effects as rest in the gravitational field". Einstein attempts to prove this by means of the familiar, highly idealized, of course, experiments with cabins: Consider, for example, a cabin accelerated by a constant force in space outside the gravitational field. The observer on the outside will argue that "the lift moves with constant acceleration because it is acted upon by a constant force". "If a body is dropped - says Einstein - then it soon strikes the floor of the lift because the floor moves upward against the body. And this happens in exactly the same way for a watch as for a handkerchief". The observer inside the cabin can, on the other hand, claim that "the lift is in the gravitational field". What happens to the objects is namely the same as that happening in the gravitational field of the earth. From this Einstein deduces that there exists no way of deciding which of the two descriptions is correct. Each may be accepted as a plausible explanation of the events taking place in the lift. He says: "Either we allow - like the outside observer - a non-uniform motion and the absence of gravitational field, or - like the inside observer - rest and the presence of gravitational field".

The other idealized experiment quoted by Einstein is the experiment with a descending lift: The observer on the outside watching the motion of the lift as well as of the bodies in the cabin, will claim that it is an accelerated motion in the gravitational field. The observer on the inside will believe that his lift is at rest, outside the gravitational field. "The gravitational field exists for the observer on the outside, not for the one inside the lift. The accelerated motion of the lift in the gravitational field holds for the observer on the outside, while for the one on the inside holds rest and the absence of gravitational field," says Einstein. He concludes from this that inside a system it is impossible to determine whether a body is at rest or moves, and that not even in the case of accelerated motions which - according to Einstein - may be interchanged for rest in the gravitational field.

It is clear to see that such arbitrary interchanges have nothing to do with objective reality. For the objective essence of the thing it is wholly immaterial whether a perceiving subject (the observer) is or is not capable according to his restricted conditions to ascertain the objective state of affairs. If there is an objective difference between motion and rest, then this difference exists without regard whether or not it is amenable to determination on a certain level of science and engineering. After all, objective reality cannot be liquidated by observer's lack of knowledge of the true state of affairs resulting from his restricted conditions. Had the author of the principle of equivalence considered the connections and causal relationships between physical phenomena, he would not have introduced such a principle in physics. But acceleration was one of the "bogies" of his relativistic theory. It appeared to be a process with absolute features and as such had to be suppressed. This is in the background of the quoted isolated situations with fictitious cabins inside of which are placed observers having no means to find out about the actual state of things. And on these errors of perception Einstein builds his principle. What would be the value of the opinion of somebody who - judging from the restricted conditions in the cabin - would think it's night though it actually were high noon.

But there are also other objections against the equivalence of acceleration and gravity. Thus, for example, a cabin in the gravitational field can remain in the same state for an arbitrary time. In the acceleration field, on the other hand, it would in a definite time attain the "relativistic" velocities with all the consequences of limit c . Or: The intensity of the gravitational field varies with the square of distance; the acceleration field does not manifest itself like this. The following objection is also remarkable: " In large regions the gravitational forces act in different directions and this results in a substantial difference between the effect of gravity and the effect of acceleration of the system"."The gravitational force of the earth aims to the earth's centre; this means that the threads on which balls are suspended at various locations in the cabin will not be stretched parallel but will subtend an angle".

The assertion that in a falling cabin bodies may be considered inertial is but an error of senses. In a falling cabin an object may be at rest relative to the cabin but not relative to the gravitational field. After all, this argument is not unknown in the theory.

From the standpoint of the kineton hypothesis, inertial motion or rest involves an unvarying state of orientation of the elementary units of the body, while free fall in the gravitational field means continuous change of this state.

The labile foundation of the principle of equivalence can also be illustrated by way of the following example: If we attach equal weights to both ends of a spring and hang this system from the cabin ceiling, the spring will stabilise in a certain position (measured with a dynamometer, it will be the weight on the bottom end). If the connection of the system with the cabin ceiling is interrupted, then:

a-/ in a cabin at rest in the gravitational field, the system containing the spring and the weights will descent by free fall to the earth; what happens is the interaction of the spring with freely falling weights, i.e. with their accelerated motion in the gravitational field;

b-/ in a cabin moving with accelerated motion outside the gravitational field, the interaction taking place after the spring with the weights has been released, is that of the spring with uniformly, linearly moving weights and their inertial motion.

In the gravitational field, no object in the cabin can be freed of the gravitational bond. In a cabin moving with accelerated motion outside the gravitational field, such an exemption from the bond is possible. An object released in a cabin moving in that way will move not with accelerated motion, but inertially, that is to say, uniformly, linearly.

In the acceleration field we can create in the cabin an inertial field (by releasing the system of the weights and spring from the ceiling); in the gravitational field this cannot be done. After release of the system of spring and weights from the ceiling we obtain in the gravitational field an accelerated system with varying intensity of the gravitational field, in the cabin moving with accelerated motion outside the gravitational field, an inertial system. In the former case, the potential force of the spring interacts with an accelerated system, in the latter with an inertial system !

To all intentions and purposes, this example seems to form the "experimentum crucis" of the principle of equivalence.

Growth of mass by velocity

The relativistic thesis that the mass of accelerated particles grows by velocity has become just winged. The growth of mass is expressed by the mathematical formula

$$m = m_o / \sqrt{1-beta^2}$$

The higher the velocity of a body, the larger the body mass, and if the velocity approaches the velocity of light, the mass grows to infinity.

" If we say that the inertial mass grows with the velocity of the body, it means" - one reads in the theory - " that the body puts up the higher resistance to further acceleration the more its velocity approaches the velocity of light". The higher the velocity, the lesser the accelerating effect per unit time. With increasing velocity a force exerts an ever lesser effect.

"It is essential" - says the theory- " that the dependence between the body mass and velocity is the same for all bodies. This dependence is of a universal character and follows from the general properties of space and time". The seconds of every body are deformed - longer - for all other bodies moving at different velocities. A change that took a second for the body, takes longer for the other bodies. At the same force, the body changes its motion relative to them more slowly, sluggishly, its mass turns out larger for the other bodies. The mass is enlarged at the ratio at which the seconds lengthen, that is, at the ratio $1 : \sqrt{1-beta^2}$.

In connection with these problems there comes to mind of every theoretical physicist the formula $m = m_0 / \sqrt{1-beta^2}$ expressing the growth of mass which - according to the theory - takes place during particle acceleration.

But even in this crucial case, the theory is not right, either. Velocity causes no growth of mass, nor dilatation of time. A statement to the opposite is nothing but relativistic speculation finding no support in objective reality. Velocity is in no dependent relation to the quantity of mattor. Velocity is but a vectorial result of the orientation of the elementary vectors of the body. The same quantity of matter can have any velocity, starting from zero, through all the values up to the limit c, depending on the orientation of the elemenatry vectors of every individual object. The orientation of the elementary vectors brings about a growth of the body velocity but no quantitative change in the body material content.

Wherever action and reaction are involved, there takes place in acceleration no growth of mass of the accelerated body - as the theory believes - but only an interchange of opposite oriented elementary units. The ensuing velocities are then but the result of the vectorial sums of those units.

The theory states that the higher the velocity of abody, the higher the resistance the body puts up to further acceleration; or in other words, the larger its inertial mass. At velocity c this mass would reach an infinite value.

Let us now examine this effect from the point of the kinetic hypothesis of L. Urbánek. The higher the velocity, the fewer the at-rest phases and the more of the in-motion phases. Since acceleration cannot be realised except in the at-rest phases, it is clear that the opportunity for acceleration diminishes with increasing velocity so that at velocity c any acceleration is already impossible. Motion at velocity c contains in fact no other but the in-motion phases, consequently there remains nothing to be accelerated. A force, no matter how large, would work in vain under the circumstances.

Methematically, too, the new interpretation is in harmony with experiments Acceleration can be realized only in the at-rest phases of the object being accelerated. According to the new law of motion, the at-rest phases grow less with velocity at the ratio of $\sqrt{1-beta^2}$: 1. No growth of mass, nor increasing"resistance"of matter is involved - as the theory erroneously supposes; only a diminishing opportunity for acceleration. At velocity c all the at-rest phases have already disappeared from the motion and this is why further acceleration is out of the question. The theory speaks of "infinite resistance" and "infinite mass"; but all that is actually involved is the impossibility of acceleration.

To sum up: Velocity brings about no growth of matter, dilatation of time, contraction of space, nor does it make the resistance of matter infinite. The cause lies in that with velocity the opportunity for acceleration diminishes. And since the number of the at-rest phases decreases at the ratio of $\sqrt{1-beta^2}$: 1, the acceleration effect, too, diminishes at that ratio.

The equation $E = mc^2$, and the growth of mass

Because of the asserted growth of mass, the theory of relativity has modified the well-known equation $E = mc^2$ to the form

$$E = m_o\, c^2/\sqrt{1-beta^2}$$

Contrary to the general laws of conservation of mass the theory of relativity assumes that translational motion causes even the kinetic charge, i.e. mc^2 to grow. This, of course, completely discredite the equation $E = mc^2$. Judge for yourselves:

Every material object is in effect in continual motion with velocity c. One can speak of a "kinetic charge" of the object. And the equation $E = mc^2$ represents just that charge. The motion, the amount of energy we are talking about can manifest themselves in the most varigated forms. First of all, as a translational motion of the object in space, or as the inner motion of the material structures. But its sum total is always only mc^2. It is important to recall that matter moves either translationally (while it is at rest inside), or internally (while it is at rest translationally). Therefore, matter cannot grow by velocity. It merely manifests itself in different motional forms: the translational or the inner one. The mass of an object could grow solely by connection, accumulation, absorption of one body by another. Only matter plus matter , not matter plus velocity can mean a growth of mass. Had velocity an effect on the growth of mass, then photons moving at velocity c would have the largest mass of all (as a matter of fact, an infinite mass).

The relativistic equation $E = m_o c^2/\sqrt{1-beta^2}$, therefore, is wholly erroneous since it is at variance with the law of conservation of mass and energy, and at variance with the equation $E = m c^2$ proper.

The relativity of mass

The theory claims that the measure of the amount of mass in a body is different for different frames, that it simultaneously has infinitely many values. " An actually existing body has different masses relative to different coordinate frames". According to the principles of the theory of relativity, the mass of one and the same object can increase relative to one and decrease relative to another object, without any material change of the inner state of the structures taking place.

Naturally, these are speculations without any support in the physical world. It is absurd to claim that a body has un unlimited quantity of values of its mass depending on the body to which the mass is referred. Actually, an object has but one value of its absolute mass relative to the absolute space. The amount of matter in a body cannot be dependent on the choice of the reference frame, same as, for example, the amount of calories in an object is not dependent on the reference frame from the point of which it is judged. After all, no change of reference frame can alter the fact that 1 g of matter contains a wholly definite quantum of energy whose value is absolute, independent of the choice of the reference body. Relative values always stem from absolute values only. The theory of relativity - by denying the absolute values of masses - commits a gross error in this respect, too. .

Equivalence of reference frames

In the theory of relativity motion is always understood to mean but motion of a body relative to another object considered at rest. A body with respect to which the motion is being determined is called the coordinate or the reference frame.

The special theory of relativity takes for equivalent all the coordinate frames " that are at rest one relative to another, or move with uniform and linear motion one relative to another." What this amounts to is the equivalence of inertial reference frames. One can claim with equal right that body A moves relative to body B, or body B moves relative to body A. Accordingly one is equally right when stating that a train moves relative to the rails, or that the rails move relative to the train.

So far as the equivalence of reference frames is concerned, the general theory of relativity went a step further. It namely admitted the equivalence of all, not only inertial, reference frames. The statements that the earth moves relative to the sun and that the sun moves relative to the immobile earth are equally in harmony with the theory of relativity.

The equivalence of reference frames is postulated by the theory with such self-evidence as though there were in existence no general laws of motion and interactions of matter, no principle of causality, as though matter were not matter but a kinematic abstraction. Or is it possible to claim in accordance with the laws inherent to matter that the earth is at rest and the sun rotates round it ? Or, that the train is at rest and the rails move underneath its wheels ? Don't there exist laws of gravitational interactions and laws of transformation of energy ?

But what is at fault here is the standpoint from which the theory starts its evaluation of motion. The moving close or away of two objects in space, the theory solves by choosing one of the objects for the reference body considered at rest, and ascribing all motion in space to the other body. It goes without saying that such a procedure is as a rule at variance with objective reality. It is not all the same whether motion is ascribed to body A or to body B ; this is why we must seek criteria that would enable us to decide the given problem in an objectively correct manner.

Imagine, for example, that on the opposite sides of the globe two objects fall to the earth, and that the relativistic opinion about the arbitrariness of reference frames holds good. If we considered the falling objects at rest and the earth as moving relative to them, the earth would have to break up. Or take the case of the train and the rails. If two trains simultaneously moved in opposite directions, where would the rails move if we considered the trains at rest ?

Of course, the situation clears up once we start to claim in harmony with objective reality that the rails are at rest and the trains moving.

The theory of relativity argues that motion with respect to space has no sense. Can one, however, deny the fact that everything that moves in space, necessarily moves with respect to that space ? Motion of an electromagnetic wave in space means after all motion relative to that space. Each approaching or moving away of bodies occurs primarily with respect to space. In this rests the absolute feature of every motion.

A testimony in favour of the absolutness of space is also offered by experiments and phenomena which the theory has long known for other reasons. One of the arguments is afforded by, for example, by the Foucault pendulum retaining the plane of swing "relative to stars" as the theory states. What is involved here, however, is not the retainment of the plane of swing relative to stars but retaining it relative to the absolute space. A pendulum so long as its motion is not acted upon by forces, retains the orientation of its elementary vectors in space without any change whatsoever; and this would be so even were the stars, i.e. fixed stars, to change their position in the cosmic space.

No theory can disprove the fact that the motion of an object in space and the velocity of this motion are of necessity reflected in the inner structures of the moving object. And it is these internal changes in the body itself that are decisive for the statement that a body moves or is at rest in space. If physics in its strife to ascertain the translational motion of a body in space, calls on relations to another body, it merely looks for a way out of difficulties. Should science ever attain the level of being capable of determining motion of bodies in space from their inner structures (from the state of orientation of their elementary vectors) as it is, for example, capable of determining the magnetic lines of force, than all theses proclaiming the relativity of translational motions and theses postulating the equivalence of reference frames will naturally come to an end.

From the point of the kineton hypothesis, translational motion of a body in space is given by the orientation of body's elementary motional units, by their vectorial sum, and a body moves in space or is at rest with no regard whatsoever to other material objects. The motion and rest depend on absolutely nothing else but the orientation of the body's elementary vectors. Consequently, every body in the absolute space has first and foremost its absolute kinetic state. Either it moves or is at rest, and that with respect to the absolute space. It is either an absolute motion or absolute rest. And the relative relations in space do not come into being except from the absolute motions or the absolute rest of two or more bodies.

It is clear to see from what has been said that we cannot but reject the equivalence of inertial frames or of arbitrary reference frames.

Continuity and discontinuity

The theory denies the existance of some lowest limit beyond which matter is no longer divisible, and adheres to the so-called local theory admitting division of matter up to a mere point, that is to say to zero. It should be mentioned in this connection that in mathematical balances this principle leads to the familiar infinite values of energy of, say, electrons. Let us quote here some views found in literature: "The infinite energy is associated with the infinitely small distance from the centre of gravity of the electron. The only possible deliverance should be sought in the assumption that electrons have finite dimensions. But such an assumption is incompatible with the theory of relativity. " Or: "There exists a collision between the conception allowing finite dimensions of elementary particles to avoid finite values of energy, and the theory of relativity ruling out finite dimensions of the particles." We can also read that" the infinite value of electron's energy is the most serious and most fundamental symptom of the crisis of contemporary quantum field theory".

As to these consequences, the theory is clearly at a loss. It says, however: "In the view concerning the structure of matter and of the world we cannot admit infinite energy and infinite matter. Everything we know of in nature, is contrary to this view".

All this notwithstanding, the theory of relativity and quantum electrodynamics set out from the local conceptions even though such a step leads to " a non-physical and absurd result".

We see how creative physical thinking runs against relativistic dogmas, how science prevaricates before taking a radical action, and with what incredible tenacity the relativistic conceptions continue despite the obvious variance with objective facts of the physical world.

Can there be any doubt about which of the two is closer to truth: the standpoint of the theory of relativity about the localism of interactions that is contrary to experiments, or the idea about the elementariness of matter, motion, space and time ?

Everything bears out the idea that matter cannot be divided ad infinitum. There undoubtedly exists a definite elementary measure that cannot be exceeded. This is logical if for no other then for the reason that matter cannot be composed of points. Neither can motion consist of points but must consist of intervals. In the microcosmos there undoubtedly exist elementary lengths, elementary quanta of matter, elementary volumes. If both matter and motion are quantated, then such elementary limits apply to time and space, too. Thus, for example, an elementary interval of time is the time in which an elementary interval of motion is realized. And since an elementary interval of motion cannot be a point (and therefore null), the interval of time is no point, either. And analogously,neither can space. There exists no point space. A zero volume of space is unthinkable. A real space could not be put together of zero volumes.

Matter actually exists in three dimensions none of which can equal zero. This is why the concepts "surface" and "point" are mere geometric abstractions, non-existent in the real world. Therefore, if there exist no zero values of matter, space or motion, we may assume that there must exist elementary quanta of these physical realities, different from zero and no further divisible. And it is these elementary quanta of matter, motion, space and time that we should consider the basic natural constants on which the whole material world is built.

Zenon's aporiae

The question of continuity and discontinuity of matter and motion was already contemplated by ancient philosophers. One of the best known is the Greek philosopher Zenon with his Eleasian school. He tried to prove - for example with his aporia called "dichotomy" - that "a body can never reach the target because it must continually overcome an infinite number of halves of paths". In the aporia "Achilles and the turtle" he proved that fast-running Achilles can never reach a slow-moving turtle because he must ad infinitum overcome the distances by which the turtle always moves ahead before Achilles gets to the place where the turtle has already been." His aporia "the shaft" is to demonstrate the impossibility of motion by that a flying shaft is at every instant at one place, that is, immobile". The fourth aporia "stadium" points out the impossibility of relative motion. In an elementary unit of time two bodies relative one to another will cover two elementary units of length.

Since Zenon's aporiae have a lot in common with some of the basic problems of modern physics, with the local theory and "infinite" values of energy, it may serve a useful purpose to make an attempt to interpret the ancient aporiae from new aspects. In doing so we shall make the following assumptions:

There exists only moving matter in the material world. Relative to space matter moves with but a single velocity inherent to it, with the velocity of an electromagnetic wave, c. If this velocity is not realized in the translational form, it is realized in the internal forms. According to the kinetic hypothesis of L. Urbánek, translational motion of a body with velocity less than c consists of at-rest and in-motion phases. The in-motion phases always have but the limit velocity, however. The higher the velocity, the lesser the number of the at-rest phases and the greater the number of the in-motion phases. And it is just this idea of quantated motion that will enable us to logically solve the problems of Zenon's aporiae.

Thus, for example, Achilles moves faster than the turtle; his motion, therefore, contains more in-motion phases that does the motion of the turtle. To the at-rest phases of the turtle thus fall the in-motion phases of running Achilles, and it is clear that Achilles will overtake the waiting turtle. This happens in the phases in which the in-motion phase of Achilles' run falls to the at-rest phase of the turtle.

The aporia "dichotomy" brings the acknowledgment of the elementary quantum of matter , motion and length. No division of distances ad infinitum can therefore take place. The laws of nature do not make division of space, matter and motion down to zero possible.If such division were possible, matter would disappear, motion stop, space cease to exist. This is why there is no other way out than to accept the view that nature exists and lives solely in quanta, intervals, elementary quantities. And this also explains the aporia "the shaft" : the shaft cannot always be at a definite point of space because objectively no such point of space exists, same as no point of time exists. Everywhere we find but intervals and quanta.

The aporia "stadium" is to disprove the elementariness of the least quantum of motion by the finding that in one elementary interval of time, two bodies relative one to another will cover two elementary units of length, not one unit. The situation is the same as when modern physics claims that the relative motion of two objects is restricted by velocity c even though it cannot be disproved that two opposite oriented rays of light move away from one another with velocity 2c ! The explanation is, of course, simple: Like the elementary length in the aporia thus also the velocity of light in modern physics must be computed relative to the absolute space. The elementary length of the ancient aporia will then remain intact because relative to space we shall always deal with the same length; and as to the velocity of light in modern physics, this will remain constant, i.e. c. The velocities of light relative to other objects are naturally c+v or c-v, not merely c , as claimed by the theory of relativity.

The law of action and reaction

The third law of Newtonian mechanics states that the action of a body, A, on another, B, results in reaction of body B on body A; the latter action is identical with the former as to the magnitude but not as to the signs. Action is thus bound to reaction by that one cannot exist without the other; they are of the same magnitude but of opposite signs.

Nearly without exception, literature offers an explanation of action and reaction by which during the interaction one body loses energy and hence also mass while the other acquires them to the same measure. Thus, for example, the physical theory is of the opinion that in a collision of two elastic balls, both energy and the corresponding quantum of mass pass from the faster to the slower object in a one-sided process.

The theory is clearly misled by translational motion of interacting bodies, and believes that with a change of velocity energy and mass change, too. But from the standpoint of physical laws, this is a great mistake. According to the third law of Newtonian mechanics, concerning action and reaction, no one-sided transfer of matter from one body to another can be involved; from the standpoint of the kineton hypothesis, what happens is an exchange of opposite oriented quanta of mass and energy. Neither of the two balls in impact will change its material content in the sense that one of the bodies would lose and the other acquire mass and energy. No one-sided transfer of energy and matter is involved but a two-sided, mutual exchange of the same quantum of energy and matter, or putting it differently, of the same amount of opposite oriented elementary units of matter. Such an exchange naturally brings about also a change in the vectorial sums of elementary vectors of each object; this will manifest itself by acceleration in one and by retardation in the other body. Neither object loses energy or mass. After the exchange interaction both bodies have the same quantum of matter as before .

In brief: Wherever Newton's law of action and reaction comes into play, there takes place merely an exchange of equal amounts of opposite oriented elementary units of matter of the interacting bodies. Changes in velocity are but a reflection of the changed vectorial sums of each of the two objects. A body can have a multidute of translatory velocities without change in the quantity of its matter. What decides here is the orientation of its elementary units and their vectorial sums.

The interpretation to which theoretical physicist adhere, is clearly erroneous since it is contrary to the law of action and reaction.

Red shift

"It was found and verified by many observations that all the remote galaxies have spectral lines shifted toward the red region (red shift). Neither the nature nor the significance of this phenomenon have been clarified so far, but the dependence of the shift on distance is unique.." Most physicists are inclined to think that this phenomenon can be interpreted in terms of Doppler's principle, that is that the galaxies move away from us, that our region of the universe dilate". According to the wide-spread view of Hubbl, every galaxy moves away from every other not only from "ours". The velocity of the galactics examined spectroscopically ranges between 1 140 and 120 000 km/sec.

One may conclude from these velocities that at certain distances galaxies would have to attain relativistic velocities and this - by the theory of relativity—would mean a rapid increase in mass of the galaxies. And since motion is a mutual process - as the theory of relativity states - it would be possible to claim that the remote galaxy is at rest and our galaxy moves away from it with a relativistic velocity. The growth of mass and dilatation of time would thus have to refer to our galaxy.

The objective physical reality is no doubt far more simple and logical:

What is the cause of red shift ? The answer may be worded as follows: Not the moving away of one galaxy from another, but the rotation of galaxies. In the rotation of a source emitting certain radiation there namely occurs dissemination of photon quanta to the surrounding space. With increasing distance from the source, the density of the electromagnetic field diminishes, the number of quanta passing through unit surface is ever smaller and smaller. In the spectroscopic image this manifests itself just by the red shift, i.e by lower frequencies. At a certain distance, the frequencies shift from the range of visible waves to the infrared band, which clearly explains the so-called Olbers's paradox. Therefore: the basic cause of red shift is not a flight of nebulae, divergence of galaxies, dilatation of the universe, etc. as claimed in literature, but a dissemination of photon quanta induced by rotation.

Rotation of the galaxies is also of significance for the emission activity of various sources. Admitting that emission is possible only in the at-rest phases of the moving source (rotating source, in our case), the frequencies are reduced by just those vibrations that would fall to the in-motion phases. The higher the velocity of motion, the fewer the at-rest phases and the lower the frequencies. It may be assumed that the rotational velocities of galaxies range within certain limits, and these limits also set the boundary for the quantity of the at-rest phases of such motions. The differentiation of dissemination therefore has its limit corresponding to the quantity of the at-rest phases. This is why at the enormous cosmic distances the reduction of frequencies does not proceed beyond a definite limit. This is the explanation of the fact that at certain distances the red shift slows down or even stops.

The photometric paradox

" In the middle of the last century Olbers proved that in the case of an infinite quantity of luminous bodies in the universe, at a uniform distribution of stars, the sky would glow like the surface of the sun; that it does not happen was to his view the photometric paradox".

Accepting the idea of "dissemination" we can explain even Olbers's paradox by the dissemination of photon quanta in cosmic space owing to the effect of rotation of luminous bodies. At metagalactic distances, the red shift attains such values that the frequencies lie outside the limits of frequencies of the visible light.

The following idea, too, is worthy of consideration: According to theory, light propagates through space in spherical wave fronts. However, theory has nothing to say about the fate of those spherical wave fronts at distances at which matter (energy) of a spherical wave is objectively no longer equal to the task of covering a spherical surface that has objectively grown beyond the limits of an electromagnetic field continuity.

Accordingly, at certain distances the photon mass emitted by the source is no longer capable of covering those enormous and ever growing spherical wave fronts, and bands of photon vacuum originate as result. It is seen that the photometric paradox can be explained and clarified from this standpoint, too.

Absolutness and relativity of values

The theory of relativity does not recognize the absolute values of such physical quantities as the length of abscissae, time interval, simultaneity of two events, mass of bodies, etc., and argues that there exist only relative values, i.e. values considered from relations.

Such speculations bring confusion in the theory. In truth the mutual exchangeability of relativistic effects is in itself already an argument against the real existence of such effects. To deny absolute values means denying the law of conservation of matter, the law of conservation of energy, various natural constants, etc. The objective real world is built solely on absolute values. And it is from the absolute values that arise the most diverse relations and in turn, the most diverse relative quantities. Consequently, absolute values are the foundation from spring out all the relative values.

An objective physical effect cannot depend only on the choice of relation but must depend on real material interactions of bodies. Nature does not go by the circumstance that it is measured by observer A or observer B; it is only the material interactions between objects that are decisive in nature. Relativistic effects that can arbitrarily be ascribed to any of the objects are mere illusions. There is, after all a qualitative difference between a physical situation in which a change of velocity has occurred on the basis of an interaction with another body, and a physical situation in which this was brought about solely by a different choice of the reference object.

It is necessary to recognize both the absolute values stemming from changes in matter itself, and the relative values which follow from relations between absolute values.

Trajectories

One of the most interesting and philosophically weightiest questions that comes up and is discussed in connection with the theory of relativity, is the question of the existence and sense of absolute motion, the question of the existence and significance of the concept of absolute trajectory.

" A trajectory is understood to mean a path described by a moving body". Einstein claims that one should not speak of a trajectory in general but only of a trajectory relative to some reference body. Einstein writes:" A trajectory does not exist by itself. Every trajectory refers to a definite reference body".

It is an incontestable fact that a body falling in a car describes a straight line relative to the travellers, and a parabola relative to the signalman". Looking at it from this angle, "the velocity and trajectory of a body have a different significance and a different form depending on the reference frame we choose".

It should not be overlooked, on the other hand, that same as there exist both relative and absolute motions, there must of necessity also exist relative and absolute trajectories. There is only one absolute trajectory of a body moving in space; there may be any number of relative trajectories, depending on the chosen reference frame.

There is no way of refuting the fact that at a certain time instant every material object has a certain place in space; this is its absolute position with respect to the absolute space.

And the sequence of such positions in space forms the absolute trajectory of a moving object. This view is not novel to literature.

The absolute trajectory in space is described, for example, by a ray of light. It is a path whose starting point is that place in space where the source of light was situated at the time emission of the ray took place, and the other end of the path the point of absolute space at which the ray struck the body in question.

<u>The Doppler effect</u>

It is a well known fact that the tone of a locomotive whistle sounds higher when the locomotive approaches us, and lower when it moves away from us. As the source of sound approaches us, the ear records more vibrations per second because the distance between it and the source shortens. As the source moves away, the ear records fewer vibrations per second for the distances lengthen. This phenomenon is called the Doppler effect.

A similar situation exists with electromagnetic waves, e.g. light. If the earth moves, for example, toward a star, the frequencies of the incident light increase because the relative velocity of light with respect to the earth is c+v! On the contrary, when the earth moves away from the star, the frequencies decrease because the relative velocity of light with respect to the earth is in this case c-v.

According to the balances of classical physics "it is not the same whether a source approaches an immobile observer, or the observer approaches a source at rest". The theory of relativity does not acknowledge this difference, however.

The theory of relativity denies that the velocity of light relative to the moving earth would have the value of c+v or c-v, and claims that this velocity is constant. To all objections it has but a single answer: dilatation of time. This is the familiar abracadabra, the "open sesame" of Arabian-Nights tales.

Let us analyze - without relativistic liabilities - the situation in which the source approaches the observer. The distance between the source and observer shortens and the observer records increasing frequencies. But the diminishing distance is not the sole factor exerting effect on the magnitude of the frequency. According to the emission hypothesis, whenever a source moves emission takes place only in the at-rest phases not in the in-motion phases. In such cases the frequencies therefore are reduced by those vibrations that would fall to the in-motion phases of the source. When a source moves toward an observer, the following two physical processes get into clash: a/ emission takes place only in the at-rest phases of a moving source and this is why at increasing velocity the frequency diminishes proportional to the reducing number of at-rest phases. From this standpoint, the frequency of light decreases; b/ as the source moves toward the observer, the distance between them shortens, the wavelength decreases and the frequencies per unit time increase.

Consequently, there is a difference between the situation in which the source moves, and that in which the receiver (observer) moves. The results of the two cases are different. The theory of relativity makes no distinction between those two situations, however.

Comparison of Römer's and Michelson's experiments

As early as the seventeenth century astronomer Römer found out that the time between the individual eclipses of Jupiter's moons lengthens when the earth moves away from Jupiter, and shortens when the earth in its rotation round the sun approaches the planet. He also offered a correct interpretation of this phenomenon by stating that as the earth moves away, light needs more time for covering the longer distance, and as the earth approaches, less time for the shorter distance. He measured the times which light required for covering the distances when the earth was closest to and farthest away from the planet, and from these two values and the known radius of earth's ecliptic computed the velocity of light to a fair degree of accuracy.

Let us compare Römer's experiment with Michelson's experiment which has become the starting point for devising the theory of relativity.

Like Römer's experiment, Michelson's experiment, too, involves the difference in distances which a light ray must cover in space. In Michelson's experiment the light flies through two arms of an apparatus: through the longitudinal (in the direction of earth's motion) and through the transverse arm, at right angle to the longitudinal one.

According to mathematical balances, the light ray covers the distance in the longitudinal arm (forth and back) in time

$$t_1 = \frac{2\,l}{c} \cdot \frac{1}{1-\text{beta}^2}$$

and that in the transverse arm in time

$$t_2 = \frac{2\,l}{c} \cdot \frac{1}{\sqrt{1-\text{beta}^2}}$$

The results of the experiment were at variance with these computations, however. They were as though the earth were at rest. The theory, however, did not look for the cause of the negative results in the method of the experiments but simply adapted the mathematical results to the negative results of the experiment. And to do away with the mathematical difference between the times in the longitudinal and transverse arms is easy enough. To make t_1 equal to t_2 all that is necessary is to multiply the equation of t_1 by the mathematical factor $\sqrt{1-beta^2}$. And this is how the factor has become the key, or more exactly, the skeleton key to the shortening of lengths, dilatation of time,etc.

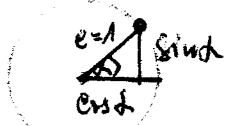
According to the relativistic explanation of Michelson's experiment , the cause of the invariability of the interference pattern should be sought in the contraction of lengths in the direction of motion. And this contraction is expressed by the mathematical factor $\sqrt{1-beta^2}$. But how can one ever explain that in Römer's experiment involving analogous situations, the time difference has manifested itself, and that there was no call for mathematical camouflage, nor speculations with the shortening of lengths and dilatation of time. And what is of equal importance: Römer's experiment was performed in astronomical dimensions and as such should be taken for more demonstrative by far.

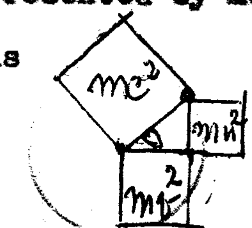
A mere logical consideration leads us to the conclusion that if objectively the earth moves in the cosmic space (and nobody doubts that), then the determination of this translational motion is a matter of but a suitable experimental method. In the time of lasers, photomultipliers, digital computers, etc. science should not view this task as one too difficult to accomplish. But science has been so distorted by relativstic speculations that Römer's experiment is closer to truth than the conclusions of the experiment on which Einstein's theory relies for support.

Conclusion

The new model of physical reality presented in this paper is built on the following fundamental principles:

a/ There is no other matter but matter in motion. This is why, even from the standpoint of the law of conservation of energy, there can exist no other velocity of matter's motion than that which is immanent to matter, which is its attribute, i.e. velocity c. This is the only velocity with which matter passes from one state of motion into another state. What in translational motions appears as a velocity less than c, is the connection of the in-motion and at-rest phases of motion, that is to say, transition of matter from the external (translational) motion to internal motion. The total amount of motion (energy) of a body is the sum of its internal and external motions, and therefore constant for a given quantity of matter. This is also in harmony with the law of conservation of energy (motion). Therefore: translational motion of a body relative to space plus internal motion of the body is a constant for the body, equal to 1. Graphically the idea may be represented by means of a unit circle with the goniometric functions





Then $\cos^2$ alfa + $\sin^2$ alfa = 1, $\cos^2$ alfa representing the amount of external, i.e. translational motion, and $\sin^2$ alfa the internal motion. Denoting the amount of translational motion by the product $m\ v^2$, and that of internal motion by $m\ u^2$, then the total energy of the body $E = m\ v^2 + m\ u^2 = m(v^2+u^2) =$ $= m\ c^2$.

b/ All motion of matter takes place in space and therefore also with respect to this space. To reject the idea of absolute space means to face the familiar inconsistencies and absurdities. The absolute space and moving matter form an inseparable dialectic unity of antitheses.

c/ Time is the equivalent of moving matter. Time is but another expression of the transitions of matter from one motional state to another. Time cannot be dilated. The flow of time is adequate to the motion of matter, and since this motion occurs at but a single velocity immanent to matter, the flow of time, too, has a single velocity identical with the velocity of motion of mat-

To the macroscopic perception of human organism corresponds, of course, macroscopic measurement of time by means of appropriate standards.

d/ The gravitational field originates by emanation of material, elementary particles of matter (gravitons) emitted to the cosmic space. The gravitational field is material and not only geometry of the relativistic time-space.

e/ Neither matter, motion or time are divisible ad infinitum ; they can be divided merely up to the limits of objectively elementary particles of matter. To admit unlimitless division of matter down to zero would mean accepting the idea of zero values of matter, motion and space. But from zeros one can hardly produce even the least really existing quantity of matter or energy. No "points" exist in nature. All material, motional and spatial qualities are composed solely of elementary quanta. The theory of relativity defending the so-called local principle, i.e. infinite divisibility of matter, finds itself at variance with natural facts.

f/ The principle of discontinuity makes transitions of external to internal motion of matter possible. The portion of energy not expressed by translational motion, is realized by internal motion. The sum of these two forms of motion is constant for a body, equal to 1.

I am convinced that on these simple principles one can build a new physical and philosophical conception of the material world and thus solve the problems to which the theory of relativity gives no, or only unsatisfactory, answer. This conception would also mean the downfall of the familiar paradoxes of time, relative motion, infinite values, and offer a solution to the problems which science has been unable to cope with since the ancient times (this refers in particular to Zenon's aporiae).

And all this can be done with notions physically and philosophically far simpler than are the relativistic postulates of dilatation of time, contraction of space, etc. It seems that with the passage of time these postulate become more and more the magic formulae that hinder further development of philosophy as well as physics than the supports of modern science.

The treatise is an attempt to devise a new model of the fundamental categories of philosophy and physics, i.e. matter, motion, time, space, gravitation, etc.

New ideas usually have no bed of roses. In the minds of many physicists views they have learned sometimes become dogmas not to be thought over, ~~and~~ attributed virtual inviolability.

It seems that the strife after new ideas is not easy in physics, either. "It is understandable that at the beginning every change meets with strong counter-claims that nothing can be improved" says the famous physicist W. Heisenberg. He adds, however, that one should not be deterred by lack of success if one wishes to bring recognition to the foreseen scientific truth.

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Slávku /a nebo pane Vašulko/,

čím slušněji, tím lépe - protože konečně byla přeložena "Teorie hmoty" Dr.Urbánka - a tedy posíláme Ti jeden exemplář s prosbou, abys jej dal k posouzení některému teoretickému fyzikovi na universitu, jak jsme se dohodli. Prosíme Tě velmi, abys posudek /i případnou zápornou argumentaci/ poslal na adresu: Dr.Otakar Urbánek,Petrská 24 Praha 1. A teď ještě soukromé záležitosti - narodil se nám syn, má sedm měsíců, jmenuje se Karel a jsme velice šťastni. Pozdravujeme Tvou ženu i Tebe a současně se omlouváme za případné potíže, které Vám touto zásilkou způsobíme.

Děkuji Ti a přijedeš-li, nashledanou

Tvůj Karel Vachek