

## Lorentz transformations contradict an objective methodological interdiction

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### 1. About a technique of comparison of spatial segments

Unfortunately, all former fair critical remarks of considerable number of sane fair researchers to address of Lorentz transformations customary in special relativity have not been perceived by scientific community to the right degree. Reasons of the author of this article about a methodological incorrectness of the process of deducing of these transformations have not considered too [1]. Apparently these failures should be referred on special world outlook and methodological complexity of a situation and for the present bad persuasiveness of the critical argument. We shall try to be more convincing well.

Not a secret, that the significant role of the invention of special four-dimensional Minkowski space-time in business of giving greater pictorial presentation to Special Relativity Theory (which have specially received by distortion of usual four-dimensional space-time by means of a doubtful way of synchronization of clocks and the artificial imposed thesis about invariance of an interval) in one's time has played. We also shall resort to the elementary geometry for giving pictorial presentation to our reasons, but without specially invented elaborate distortions.

As it is accepted in all elementary textbooks, we shall consider a standard situation with mutual movement of two *systems*  $K$  and  $K'$  with high speed along the combined axes  $x$  and  $x'$ . (See Fig.1):

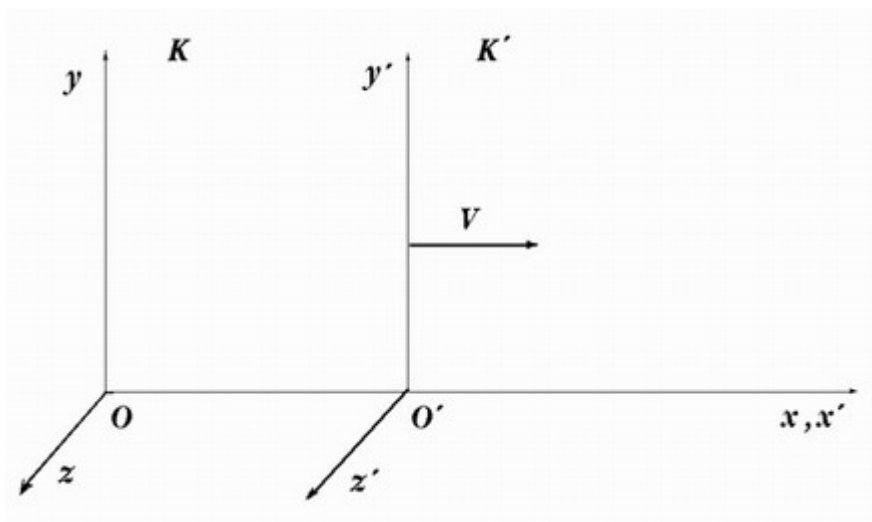


Fig.1

In the further we shall exclude axes  $y, y', z, z'$  from consideration for simplicity and we shall represent a situation in the Cartesian orthogonal system of coordinates, on a bidimensional space-time plane. (See Fig.2).

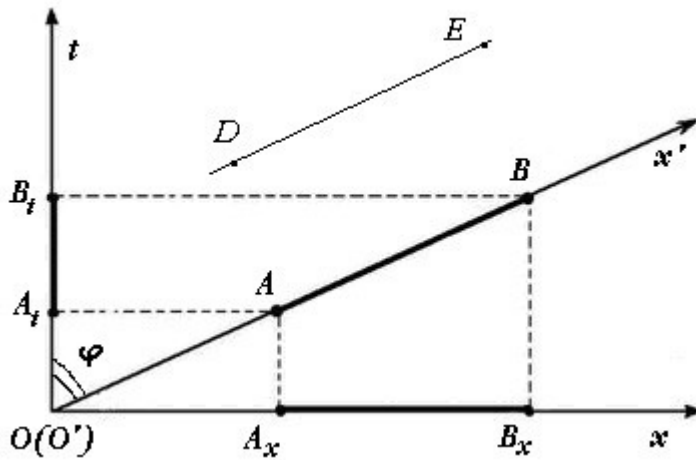


Fig.2

By analogy to Minkowski space-time we shall consider, that each point on this plane, having the spatial and time coordinate, corresponds *to world event* in a described situation.

Here  $xOt$  - system of a stationary observer. During the initial moment of time as it is usual, reference marks of two systems  $O$  and  $O'$  it is considered conterminous. Point  $O'$  will move in the course of time on an axis  $x'$  in this figure, representing the direct line located under a corner  $\varphi$  in relation to an axis  $t$ . At that  $\varphi = \arctg V$ , where  $V$ -speed of movement of *system  $K'$*  in relation to *system  $K$*  from the point of view of observer from system  $K$ .

Let's consider, how movement of rod  $AB$  based in *system  $K'$*  and located along an axis  $x'$  will look here. Obviously, the rod in the course of time will slide on an axis  $x'$  with all own points too. We shall note, that all points of a rod in *system  $K'$*  coexist simultaneously, are in one temporal "section" or temporal "echelon".

From thought experiment with « Einstein's train » we know, that the infringement of a principle of simultaneity of events in spatially divided points in two systems moving with high speeds takes place. This phenomenon has received the name « a relativity of simultaneity ». The essence of a phenomenon is evidently visible on Fig.2. All simultaneous events in *system  $K$*  lay on the straight lines parallel to axis  $Ox$ . For example, simultaneous events in points  $A_x$  and  $B_x$  here are. Nevertheless events, simultaneous in *system  $K'$* , lay already on the straight lines parallel to axis  $Ox'$ . In particular, it is points  $A$  and  $B$ . It turns out, that two events, simultaneous in *system  $K$* , do not be such in *system  $K'$*  and on the contrary. Each schoolboy knows about it today.

Now we shall try to make the act of measurement of length of this rod, using opportunities and tools of stationary *system  $K$* . In *system  $K$*  along axis  $Ox$  we shall arrange a measuring bar by means of which we shall try to measure length of a moving rod. We shall note, that all points of this bar coexist simultaneously (in one time section) on axis  $Ox$  into the combined moment of time  $t=0$  and on an axis parallel to it into any other moment of time.

The standard technique of contact sensing of length of a line segment means superimposition its ends with point labels on a measuring bar. Means, a rod and a measuring bar should have **two joint (coincident) world events**. How business with it at us in this case is?

On Fig.2 it is evidently visible, that the rod can be superposed without effort by all own points or at least by two extreme with all measuring bars located in systems, moving with the same speed in relation to  $K$ . These bars are displayed on the lines parallel to axis  $Ox'$  (for example,  $DE$ ). However it is impossible to tell the same about axis  $Ox$ . It is obvious, that axes  $Ox$  and  $Ox'$  are not parallel, therefore cannot be completely superposed, and can **be crossed only in one point**. This consequence of the elementary Euclid axioms. It turns out, that the rod can meet a bar into the certain moment of time per only one own end (generally – per only one point of own body). Superimposition of other end of a rod (generally – any its other point) with a bar becomes possible only into *other moment of time*, through a certain time interval. However it means that the second *event occurs in other time echelon*. During the specified time interval the first end of a rod and all other points of its body, certainly, "will depart" on significant distance so it will not turn out as the correct act of measurement. Essentially important fact is that all points of a body of a rod, except for one superposed, appear in other time echelons. Each point of a body of a rod for a meeting with a bar should wait exclusively the especial time echelon. The transparent conclusion from here follows, that **the rod and a measuring bar cannot have two or more joint (coincident) world events and consequently their lengths essentially cannot be compared**. This conclusion is so important, that deserve get-up in the form of special cognitive restriction or an interdiction that we shall make later. We already described this situation in details earlier [1], now this extraordinary occurrence is evidently visible per geometric visualization.

Perhaps, something will be changed with attempt of contactless remote measurement with use of transfer of the information by means of any signal? However signals from the ends of a rod, being are let out simultaneously in system of a stationary rod, with identical speed will move ahead to a measuring bar, being during any intermediate moment of time on direct, parallel axis  $Ox'$  and consequently also cannot meet her simultaneously in *system  $Ox$* . These signals during all time are within the limits of the own time echelon and cannot replace one time echelon with another at will. The situation will be similar at attempt of transfer of a signal in the opposite direction, from a measuring bar to a rod. Both these variants we already considered in details earlier [1].

For a case of usual small speeds this fact, maybe, has no so big methodological value. During described « defect of a simultaneity » the rod has not time "to depart" too far so distortion of its length observable from another system will be insignificant. However when the rod and a measuring bar mutually move with high near-light speeds, the problem gets basic value. If to adhere to strictly scientific objective methodological approach, it is necessary to ascertain, that **act of exact measurement of length of a rod and, in general, lengths of any line segments " in the air ", by measuring means of moving system turn out impracticable in principle**. Moreover, *the objective methodological interdiction* on any intersystem comparison of lengths of line segments and other extensive parameters along a line of moving of two systems takes place. As these pieces can have only one general world event, as we saw it on Fig.2, those parameters in these two systems which are entirely defined by frameworks of this dot event, for example, its spatial coordinates are supposed to comparison only. *So, it is admissible to intersystem compare in moving systems with coordinates only one point*.

## 2. Transformation of a time scale

In the classical mechanics with its small speeds axes  $t$  and  $t'$  consider conterminous. Here transformations of coordinates of a point are reduced to transition from rectangular Cartesian

*system K* to oblique-angled (affine) *system K'* with one conterminous axis  $t$  ( $t'$ ). Galilean Transformations are those:

$$\begin{aligned}x' &= x - V \cdot t \\t' &= t\end{aligned}$$

However we know that Galilean Transformations are not compatible to Maxwell's Equations. For a case of movement with velocity of light or nearly other formulas should be found. Here again in all growth there is a following methodological problem: how to deduce formulas of transformations in conditions above the discovered objective interdiction on intersystem comparison of lengths of line segments? We shall recollect that all known variants of a conclusion of Lorentz Transformations are based on intersystem comparison of observable fragmentons, including infinitesimal ( $dx$ ,  $dr$ ,  $dS$ ). Obviously, all this should be refer to *incorrect procedures from the point of view of objective scientific methodology*. Moreover, there is all the bases to assume, as Lorentz Transformations, being are deduced by the mentioned incorrect ways, cannot be necessary correct formulas of transformations. The scandalous circumstance appears.

How such methodological disorder could happen? Obviously, in days of creation special relativity the intuitive aspiration to prefer transformation of a spatial component to transformation of a time component has played with physicists a spiteful joke. The second, apparently, was too frightening theirs of the uncommonness. Therefore physicists have taken Lorentz's idea about spatial "flattening" of objects at high speeds of movement and the corresponding formula of this deformation practically without alternative.

In those days empirical criticism was reign over the minds of physicists. And favorite of empirical critics *the principle of economy of thinking* in this case, apparently, has become a principle sparing their mind, leading thinking on a way of more habitual, less shocking schemes. But it has appeared, that this "sparing way" has brought as a result to the big bog of shocking consequences: as a result of Lorentz Transformations of coordinates have undergone to distortion both of space and time, and plus a phenomenon of a relativity of simultaneity in addition. And only now the fact of a methodological incorrectness of these transformations was found out. Obviously, it is necessary to search for other methodologically correct way, as well as possible really saving thinking and not leading to so grandiose transformations.

We have earlier already found out [1], that correct formulas can be received without any problems directly from the analysis of mental experiment with « Einstein's train ». The saving thinking observer at station comes to conclusion, that the problem of a relativity of a simultaneity, that is a problem of a mismatch of hours in two systems can be easily solved if to admit the fact of presence of time displacement in spatially divided points. Hence, it is necessary to correct the formula of transformation of a time scale by means of addition of spatially dependent component.

We earlier already calculated size of a mismatch of scales  $t$  and  $t'$  from the analysis of this mental experiment [1]:

$$\Theta t = \frac{\bar{x}\bar{V}}{(c^2 - V^2)}, \text{ where } x - \text{distance between described points on scale } Ox$$

From the formula it is visible, that in case of coincidence of a direction of vectors  $\bar{x}$  and  $\bar{V}$ , the displacement will have positive size, and in case of discrepancy – negative. That is, for example, in case of a direction conterminous with movement of observable object, the relative *delay* of events on a time scale, and in case of an opposite direction – a relative *forestalling* will take place. One end of a train in mental experiment with « Einstein's train » is for the observer along movement of a train, and another – against. So a relative forestalling of events on one end and a

relative delay on other end compensate effect of displacement of a train during movement of a ray of light.

Thus, the situation for movement with near-light velocity on the elementary space-time plane will look geometrically as follows:

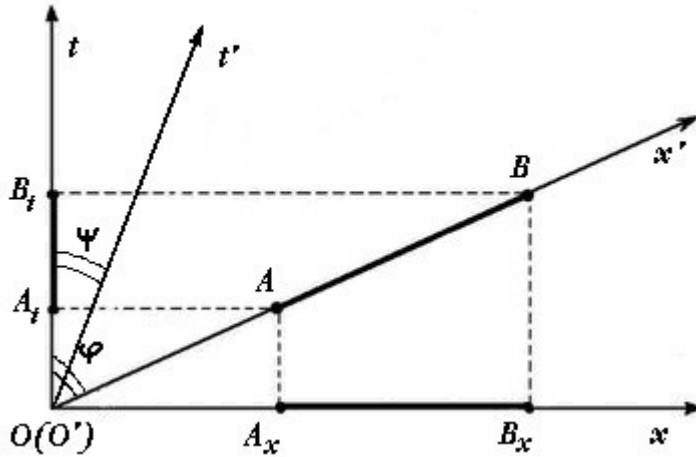


Fig. 3

As axes  $Ot$  and  $Ot'$  are directed under a corner to each other, the above-stated reasonings for axes  $Ox$  and  $Ox'$  will be fair for them too. It is necessary to ascertain, that pieces on a time scale or *time intervals* in two mutually moving systems too can have only one point of crossing. Thus, time intervals in two systems cannot be methodologically correct comparing with each other too. It is permitted an overlapping only one coordinate on a time scales.

### 3. Lorentz Transformations and the Einstein's way of synchronization of clocks – outside of the law

Let's sum up. On a way of attempt of correct measurement there is *a basic methodological barrier*. It appears impracticable in principle. It is found out, that superposition only one space-time point in two moving past each other systems (in case of four-dimensional space-time - superposition on a cross-section plane  $y, z$ ) is admissible. Using terminology of Minkowski, it is necessary to approve: two such systems can have only one general *world event*. As such world event a start or a finish of light beams in the combined beginning of coordinates of two systems (See Fig.2) as it is made in Michelson-Morley Experiment or a meeting of two beams in the middle of a measured line segment in mental experiment with « Einstein's train » can be chosen. But any second event in any second point is already cannot be correctly superposed. So mutual comparisons of lengths of spatial or time pieces in two such systems become absolutely impossible.

From here a particular conclusion: all calculations in which comparison more than one point in bidimensional and more than one plane in four-dimensional cases takes place, it is necessary to consider incorrect, to tell more precisely, in general wrongful.

If to consider, that all variants of "conclusion" of Lorentz transformations for a bidimensional case are based on comparison of a different sort of pieces (spatial and time pieces, vectors, radius-vectors and intervals), let even infinitesimal ( $dx, dt, dr, ds$ ) it is necessary to recognize all of them incorrect. Accordingly, it is necessary to recognize wrongful all transformations,

received in this way. It is necessary to consider incorrect also the way of *synchronization of the clocks* offered by Einstein, based all on the same intersystem comparison of space-time pieces. *Let's repeat, we already brought these facts to attention earlier. Now all this is visible descriptive-geometrically.*

Knowing size of a mismatch of time scales, it is possible to write the formula of transformation  $t' = t - \frac{x \cdot V}{c^2 - V^2}$ . It will mean on the bidimensional space-time plane, that the axis  $t'$  will take up position under a corner  $\psi$  to an axis  $t$ .

At that  $\psi = \text{arccctg} \frac{V}{c^2 - V^2}$ .

So, correct formulas of transformations for two moving systems will look like:

$$\begin{aligned} x' &= x - V \cdot t \\ t' &= t - \frac{x \cdot V}{c^2 - V^2} \end{aligned}$$

And it is not necessary to think out anything anymore here.

#### 4. New system of transformations and the Michelson-Morley Experiment

Obviously, it is necessary to show, as proposed system of transformations will be coordinated with experimental data. We shall consider it on an example of Michelson-Morley Experiment (See Fig.3):

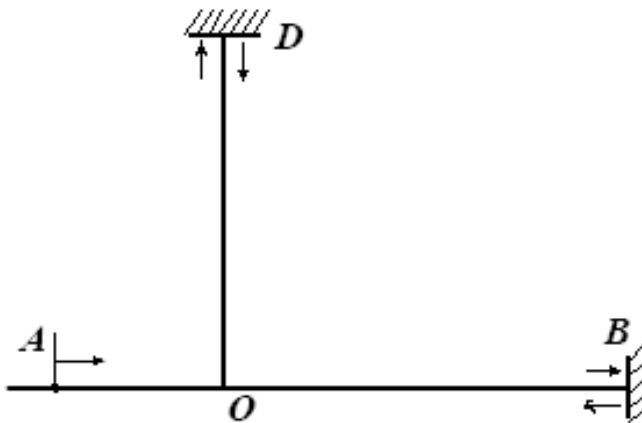


Fig. 4

We accept that unique possible general world event for two systems – a meeting in space and time of two beams, longitudinal and transverse in a point  $O$  takes place. For the system connected with experimental installation, all it is so obvious. In system, concerning which this experimental installation moves with speed  $V$ , events occur in the same space points, but with displacement on the time. Size of displacement is considered of known mental experiment with « Einstein's train » and equal:

$$\Theta_x = \frac{x \vec{V}}{(c^2 - V^2)}, \text{ where } x - \text{distance between investigated points on scale } Ox.$$

The observer to whom there "has arrived" the center  $O$  from point  $A$ , understands, that time spent for a way by a transverse beam, is equal

$$t_1 = 2l/c + \Theta_{AO}$$

(Taking into account a displacement of a time scales between points  $A$  and  $O$ ). Time spent by a longitudinal beam on passage  $AB$ , is equal

$$t_{AB} = l/c + \Theta_{AB}$$

(Taking into account a displacement of a time scales between points  $A$  and  $B$ ). And time spent for passage  $OB$ , equal

$$t_{OB} = l/c - \Theta_{OB}$$

(Taking into account a displacement of a time scales between points  $O$  and  $B$  and changes of a sign at movement in an opposite direction). In sum  $AB$  and  $OB$  are the general way of a longitudinal signal so time of longitudinal passage  $t_2$  will be equal, taking into account a difference of two displacements ( $\Theta_{AO} = \Theta_{AB} - \Theta_{OB}$ ):

$$t_2 = t_{AB} + t_{OB} = 2l/c + \Theta_{AO} = t_1$$

Thus, times of passage of longitudinal and transverse shoulders of interferometer are equal for the moving observer too. The consent with experience obviously. One should think that similarly can be explained and results of all other experiments illustrating "relativistic" features.

Against the received formulas of transformations charges in their seeming "asymmetry" are possible. Really, the requirement of symmetry for record of transformations leads to the following:

$$\begin{aligned} x &= x' + V' \cdot t' \\ t &= t' + \frac{x' \cdot V'}{c^2 - V'^2} \end{aligned}$$

However, it is necessary to pay attention, that  $V$  and  $V'$ , the speeds of mutual moving from the point of view of each of two systems, are the absolutely different parameters. Presence in two systems of only one conterminous world event excludes for us an opportunity of intersystem comparison of speeds which are defined by means of private from division of spatial and time pieces  $V = dx/dt$ ,  $V' = dx'/dt'$ . So formulas of direct and inverse transformations do not contradict each other, and no problem with a form of inverse transformations is present.

## 5. The Cognitive Status of Lorentz Transformations

The situation with an interdiction on comparison of space-time pieces should puzzle the researchers, wishing, nevertheless, to possess enough by the capacious information on events in other system. Perhaps, Lorentz transformations all the same will be useful to us in any cases? On Fig.1 it is visible, that moving rod  $AB$  casts the projection  $A_x B_x$  on axis  $Ox$ , and projection  $A_t B_t$  to axis  $Ot$ . In case of methodological inaccessibility of exact correct measurement the researcher, wishing definiteness and pictorialness, obviously, *neglecting losses on displacement of a rod during time defect*, can to set for itself a problem **quasi-correct displays** and to take advantage of the specified projections as *substitutes* of real parameters. For the lack of a normal mirror it is possible, alternatively, to try to use a distorting mirror. Lorentz's formulas just it is necessary to reckon among such ersatz-representations. They obviously deform real characteristics of observable object and cannot be used in strict calculations; however nobody forbids using the approximate representations for the approximate calculations. But for all that it is important to remember about this **quasi-correctness**, to hold it in mind. It is necessary to recognize as the mistake of authors and adherents of the Special Relativity the fact, that they

raise this quasi-correct representation in a rank of a unique reality with which it is necessary to deal. Actually with the aid of Lorentz Transformations it is possible to judge only scale of observable distortion of real parameters of moving by objects. It is solely the characteristic of a specific aberration of an observable picture at high speeds of movement – and no more that.

Lorentz Transformations give a local picture of observable distortions, it is a specific « observational physics», a version of *the descriptive science*, aspiring to absolutize the narrow private vision, to limit itself only to that is obviously found out in experience and by that to oppose with itself *to the explanatory science* opening causal bases of the phenomena. Strictly speaking, it should be referred to crude intermediate semi-empirical knowledge, poorly processed by scientific system of theoretical thinking, to an under-science.

At the article of D. Bohm [2] the bright example with two recessive travelers is made, each of which in opinion of another eventually decreases in the observable sizes. However everyone know, that in this case *the observable* angular sizes decrease only, and for nobody will come to mind to insist on the fact of real reduction of the sizes of travelers. It is possible to give an example also with heard distortion of a sound from a moving by source, known as Doppler's effect: everyone know that it is only specific phenomenon caused by mutual movement of a source and the receiver, and it has no attitude to the basic physics of a sound. If to use photo- or the video equipment with the big exposure moving by subjects merge on a picture in one blurry stream. However, thankfully, nobody yet did not do a terrible conclusion from this fact about real loss of the precise outlines by the moving objects. For certain it is possible to give many examples of specific distortions and the aberrations, accompanying situations of mutual moving of a subject and the observer, it is possible even for the refined aesthetes to describe a special exotic local picture of the observable phenomenon, it is possible even to write the special exalted philosophy of the fascinated observer. However it is not necessary to try to absolutize it, try to substitute this perversion for the strict objective physical essence.

Unfortunately, we live during an epoch of domination of philosophy of empiricism in its several modern versions today. One of its branches is *relativism*, aspiring inadequately to overestimate a position of the observer and to belittle objective characteristics of objects of the nature. However in the milieu where the strict exact science have respect, nevertheless, there is strong an intuitive aspiration to a recognition of the fact of objective existence of the real world, independent of the observer and his cognitive situation. This spontaneous materialistic impulse, unfortunately, has not found a worthy embodiment in the traditional materialistic philosophy, proved unable to answer a number of key questions. However today it is possible to breathe with relief because, at last, appeared a healthy doctrine of the materialistic orientation, capable to overcome traditional stumbling-blocks of materialism and thus to develop the hand about a hand with other progressive philosophical currents. It is *the synthesizing realism* which is based on use of idea *ring determinism* [3, 4].

The situation with relativism, in our opinion, is evidently illustrated by a following example. We shall imagine the big branchy tree on each branch of which sits a raven, considering itself as wisest. It is clear, that each of them observing for world around under the special foreshortening, has before itself a special picture of the events and events pattern differing from others. If to stand up on a way of absolutization of an observable picture, favorite for relativists and other empiricists, it is necessary to deal with a great many of variants of the reality differing from each other that can lead to chaos in knowledge. Much more reliably and more conveniently, professing a principle of *polyhedral (many-sided) monism* [3, 4] to admit the fact of existence of a unique objective reality, visible different observers under specific foreshortenings and consequently naturally differing in their descriptions.



## 6. New Cognitive Situation

Following the great philosopher Kant we should inquire ourselves once again: what I basically can know about world around, in particular, on its extremely distant boundaries? Obviously, this situation has features of a basic originality and consequently should be characterized with use of a special principle which project is offered below.

***Principle of the limited accessibility:*** in two systems moving rather each other with high speed cannot be compared (with a view of measurement or other purposes) anything more than one space-time point in a bidimensional case and anything more than one space-time plane, transverse to movement, in a four-dimensional case. Accordingly, in these systems those parameters which are completely defined in this point, for example, its space-time coordinates can be compared only. ***All other parameters appear inaccessible to comparison.***

It, certainly, at all does not mean, that they disappear somewhere in "native" system, actually their exact value becomes inaccessible for moving by "relativistic" observer. If this observer adheres the philosophy of empiricism in its modern versions he can draw a conclusion, convenient for him, about real absence of these parameters inaccessible to him in general, completely exclude them from sphere of the consideration. However thus he risks subsequently colliding with them under the changed circumstances (for example, in case of alignment of speeds) and, besides, he can himself appear in a similar situation when parameters of his own system will be ignored by other observers.

It is necessary to note, that this situation is not so surprising nowadays and partly reminds that, which has developed in the mechanic of a microcosm where the significant set of combinations of some parameters describing movement of micro particles, becomes inaccessible to the macro observer. Unfortunately, unlike our case there the micro particle is deprived an opportunity « to stand up for itself », therefore physicists absolutely unpunishedly deprive it of right to possess these combinations of parameters objectively. In particular, they had taken away at it the right to have own trajectory of movement. There till now profess a primitive empirical principle: I do not observe – means, it is not present in the nature. And the principle of the limited accessibility which was assuming at them view as *Heisenberg indeterminacy principle*, they treat, as real absence of parameters, inaccessible to measurement, in the nature of micro particles.

Mankind collides with the specific restrictions in access to a number of interesting parameters in cosmology too. It too have objective character: limitation of speed of the signaling, not allowing to receive the current information on much removed objects, limitation of term of human life and mankind in comparison with cycles of passing of mighty space processes and the inaccessibility of supervision of the last concerned with it and so forth.

Anyway, speech in all these cases goes about one general cognitive problem: occurrence of specific objective restrictions on ways of knowledge of extremely distant areas of life of the person and the nature. It is necessary to ascertain, that the mankind at once on several sites of knowledge has clashed against a specific cognitive fencing, behind which it is possible to observe directly only a part of an interesting objective reality, to find out the incomplete, limited set of its parameters. Now comprehension of importance of an indisputable truth should come, at last: the person learns reality through a prism of special ***area of the contact*** with it, and from specific properties of this area depends, what picture of this reality he can depict for himself as a result. And the area of contact at times appears objectively enough narrow and uncomfortable.

Thus objectively limited accessibility of direct empirical research opportunities creates a situation promoting growth of a topicality of substitutional ways of research: significance of dimensions of indirect parameters and more resolute and wide-ranging designing of system theoretical knowledge on this base increases. A topicality of this problem will be inevitable to increase with the further progress of knowledge on its remote boundaries, and it is necessary to be considered with this fact both to researchers, and philosophers of a science. So supporters of empirical and positivistic approaches to cognition inevitably should make place seriously. If to continue, as the empiricists recommend, to be limited to consideration of only those parameters that are accessible for direct supervision, excepting others from consideration, it is possible in general to lose ability to comprehend deep essence of the natural phenomena and to stop at a level of cleanly descriptive knowledge, to get confused in huge volume of poorly sensible information as it, for example, has occurred today in the physics of a microcosm.

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