the general science journal

Three-Dimensional Objects Only Consisting Of Time-Burdened Space As A Basis Of Matter And Its Interactions (Theory of Objects of Space)

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Abstract: From the constancy of light speed as demanded by the theory of special relativity (SRT) the time dilatation, the length contraction and the unsynchronisation of time arises. These three quantities (values) are not to be applied only to matter but also to the space as such, which is contained by matter. Due to this it yields that space areas can be distinguished from other space areas by these three quantities (values). Since these space areas, which are burdened with SRT values, must be in space again, too, it results that these space areas (burdened with SRT values) can move in space as objects. When these space areas meet then they overlap each other three-dimensionally and by doing this they build overlap areas (OA) with new SRT values. In this way these space areas burdened with SRT values can interact with each other, what for they are named space objects (SOs). It turns out that the SOs are able to interact with each other in the most various ways. How this happens is shown among others in this work. Due to their interactions the SOs are able to form highly complex structures, which we know as matter. Matter in its turn interacts by emitting and absorbing grate numbers of SOs in a field like manner. The great importance of the SOs in our world is underpinned in this work with several interesting examples; with that it is shown how the concept of the definition of the SOs can be used, and that it makes sense to use it. The SOs are the elements upon which all things are based and simultaneous they are the most basic of all elements also (in the time burdened three-dimensional space). The "Theory of Space Objects" represents a link between different sections of physics such as gravitation, quantum theory, relativity, electromagnetism, building-up of matter, and much more.

Key words: General concept explaining field-like interactions, build-up of matter; phenomena: pair creation, interlacing of photons, energy and momentum gain, etc.
PACS: 03.30.+p; 03.50.-z; 03.70.+k; 04.60.-m; 11.10.-z; 11.10.Kk; 12.10.-g; 14.20.Dh; 21.60.-n; 31.10.+z; 32.10.-f And in addition: 03.65.-w; 03.65. Nk; 03.67.-a; 03.75.-b; 04.65.+e; 05.45.Xt; 05.60.-k; 05.65.+b; 06.30.-k; 11.30.-j; 11.80.-m; 12.15.-y; 12.40.-y; 13.40.-f; 21.10.-k; 21.30.-x; 32.80.-t; 34.10.+x; 34.50.-s; 34.80.-I; 41.20.-q; 42.25.-p; 95.10.-a; 98.10.+z

0. Introduction

This work consists in principle of three parts: In the first part the concept of the space objects (SOs) is introduced and first simple application examples are shown. In the second part further important criteria are worked out about the SOs, which arise from considerations about the observation location, and corresponding examples are shown. In the third part it is primarily about to apply the concept of the SOs to matter and its interactions, and in one of the examples it is shown among others that it doesn't come to any contradictions with the theory of special relativity (SRT).

0.1 Basic idea

If the theory of special relativity (SRT)[1] is applied to a spatial object (e.g. a train wagon) then it is clear that the conditions of the SRT must be valid for the space, which the object encloses, also. Finally, therefore, it seems sensible that the conditions of the SRT must be valid for the space as such. This means that moving space is - in dependence of its speed - distinguished from other space, which moves with other speed, by its SRT values (which arise by the time dilatation, the length contraction, and the unsynchronisation of time). This, though, makes only sense if the SRT values are applied to bounded

(restricted) space areas (such as the mentioned train wagon) and not generally to the entire space. (At this, it has to be taken into account that every material object encloses space.)
So, the individual space areas are distinguished from each other by their SRT values now. Here now, the presence of matter is no longer necessary for the definition of a space area.
To assign a speed to the space as such only makes sense at all, since space is distinguished from other space (by its SRT values).
If space areas can move, then they also can meet. In difference, though, to matter space areas do not collide, when they meet, but they overlap each other three-dimensionally. The actually interesting question, which arises here, is: Which SRT values will the overlap area have? In this work it will be considerably about to find criteria which shall help to answer this question. At this, it will be found out that the space areas, which are burdened with SRT values, are able to interact with each other, therefore, that they have also material character. Finally arises that matter is nothing else than a complex structure of space areas interacting with each other. (About the SRT see also [2] [3] [4] [5])

1. General criteria

1.1 Overlap area

The first and most important criterion sounds simple but, nevertheless, it isn't conceivable in its whole consequences easily:

> Every space area (SA), which arises from overlapping, is an independent, proper space area of its own. (That this statement makes sense, discloses itself in the course of this work.)

If, so, e.g. two space areas (SA) overlap each other three-dimensionally, then the overlap area (OA) changes its size and form during this overlapping - since it is being created during this overlapping. Simultaneous, of course, at this the SAs, which are overlapping each other, change also - since they dissolve into the OA. The exactly way this things happen depend essentially on the values, which the OA will have (so e.g. the value and the direction of its speed). Without, though, experimental data the exact course of such a overlapping cannot be defined. So, here the overlapping is treated in general terms.
So, what happens during an overlapping? Well, essentially the SRT values of the overlapping SAs change while simultaneous a new SA (the OA) is arising (in the overlapping area) with its own SRT values.
Here, now, it shall be retained briefly, which the three SRT values are: 1.) Time dilatation: the watches within a moving SA have another response speed. It is: $t'=Rt*t$, in which t is the time measured by a resting observer and t´ is the time in the moving SA, which has passed during t. 2.) Length contraction: the length of a SA changes in dependence of its speed. It is: $L'=Rs*L$, in which L is the length of a moving SA from the view of a resting observer while L´ is the length of *the same* SA from the view of an observer resting relative to the SA. 3.) Unsynchronisation of watches: the watches of a moving SA are unsynchronized in motion direction, if they are synchronous from the view of an observer resting to the SA. It is: $Rts=RtL/L$, in which RtL is the unsynchronisation along the length L. [6] [7] [8] [9]
The most interesting quantity for the spatial changes of the SAs is understandably the Rs value.
When two SAs overlap each other, then this has to be understood that way that their Rs values change into that one of the OA. So, at first one must ask generally the question in which way the Rs value of a SA (or generally of an object) changes. This becomes the easiest if we connect the SA with a scale (measuring rod). So, when the Rs value of the SA changes, then the distances between the markings of the scale change. There are two cases to be distinguished in principle at the overlapping of the SAs: 1.) The SAs move in a straight line. 2.) The SAs move perpendicular to each other.
At first we look at the first case: Here the overlapping can take place by the SAs meeting frontally or by overtaking each other. Now, it is that for the SAs the conditions of the SRT shall be valid. This means that with growing speed the distance markings of the scale of a SA move closer together (and with declining speed they move apart). At the overlapping on the same straight line the distance markings of the overlapping SAs can get only one after the other into the OA in the direction of the motion. By meeting frontally the distance markings of the changing SA move from its front side (with respect to its motion

direction) into the OA. If, now, the distance between the distance markings shall decrease (which corresponds to a compression), then the speed of every distance marking must get smaller as soon as it reaches the OA so that the following distance marking can move up correspondingly. This, however, contradicts the terms of the SRT where at a compression the speed must get larger. So we look at the overlapping by mutual overtaking. Here the overtaken SA is overlapped by the OA, formulated descriptive, from behind (with respect to its motion direction). In this case the speeds of the distance markings of the overtaken SA, which are overlapped after each other (from behind), must actually get larger for a compression so that they move closer to the distance markings not overtaken yet. So, for the overtaken SA the conditions of the SRT can actually be valid. On the other hand, though, the overtaking SA also moves into the OA and must change its Rs value correspondingly. A change of the Rs value coming from the front cannot agree, however, with the SRT as we have stated. Now, some quite complex and very circumstantial assumptions could be formulated here with whose help the SRT conditions would keep validity for overlappings of SAs, but in the course of this work it will crystallize more and more clearly that it actually seems here more sensible to state that the SRT conditions represent only a special case at the overlappings of SAs.

> This leads to the general statement, that for SAs the Rs, Rt and Rts values don't have to meet the conditions of the SRT. (also see Figure 3 in chapter 3.3)

So, SAs can have generally any Rs, Rt and Rts values. At first this seems quite arbitrary but it must be considered that SAs aren't material objects. On the other hand it will be shown that matter consists of nothing else than of complex structures of SAs, which are interacting with each other (the SAs). That the analysis (definition) of SAs does make sense arises out of this, as already said, that the SAs are distinguished from each other by their Rs, Rt and Rts values. That these SAs actually can interact with each other and how they do this will be shown in the followings. At this it is primarily all about the analysis of the OA. Since SAs can interact with each other they have also material character so that from now on they are named space objects (SOs). The interaction possibilities, though, of the SOs surpass that of normal matter by far. For the complex structures of SAs, which form matter, the conditions of the SRT are valid in sum. So, e.g. the electric charges (as electrons and protons) and their electric or electromagnetic fields consists of complex structures of SOs for which the conditions of the SRT are, of course, valid resultantly (what will be shown in part 3). If, though, one accepts that for the SOs the conditions of the SRT don't have to be valid generally, then with the help of the SOs numerous of (partly still open) physical phenomena can be represented and explained very elegant and satisfying. Some of that is shown in part 2 and primarily in part 3. At this, of course, it is clear that the complex SO structures, of which matter consists of, cannot interact in the simple ways as this is the case at the pure SOs. The interaction conditions, though, arising for the complex SO structures build up on the interaction conditions of the simple SOs, and among others by this SRT is produced.

1.2 Fix point

Since, now, it was defined that for SOs the Rs, Rt and Rts values are independent from speed, the OA of SOs, which move perpendicular to each other, can be interpreted better, because now SOs can also have Rs values perpendicular to their motion direction with $Rs \neq 1$. And this (perpendicular) Rs value also will change in the OA - just as the Rs value of the overlapping partner whose Rs value in this case is then parallel to the speed of this SO. (see Figure 1) Here, now, all the distance markings of a scale connected to the Rs value move simultaneous into the OA. How do the distances between the distance markings change here now? A simple speed change as in the previous where the distance markings were overlapped one after each other doesn't suffice here.

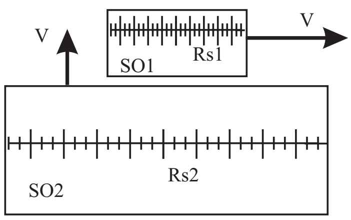

Figure 1 Perpendicular overlapping

If we look at a resting scale whose length we want to change, then we would choose a fix point relative to which we would move the distance markings of the scale. (So e.g. we could choose one of the ends as a fix point and compress or stretch the scale like a spring.) In an analogous way we also can change the Rs value of a SO (here, it has to be taken into account that the fix point can move with the same speed as the SO). During the length change a motion of the distance markings (and of the SO respectively) takes place relatively to the fix point and so the (length-change-) speed of this motion then must be added to the already existing speed. As soon as the length change is completed, the length change speed becomes zero again. At a material object, such as a scale, it will be obvious to assume that the fix point is at someplace on this object. At SOs, however, there is no reason for such an assumption.

The fix point of the length change of a SO can be in principle also outside this SO at generally any place.

The meaning of a fix point, which is outside a SO, is that the speeds of the length change of the SO do last until the complete distance up to the fix point has adopt the same length change (Rs value change) as the SO. (see Figure 2)

It is interesting, now, that this fix point can also be in the infinite. This means that the motions (or speeds), which cause the Rs value change, last eternally. Such a velocity cannot be distinguished from a normal velocity in principle any more. Velocities, therefore, which arise from Rs value changes, can't be distinguished from other (normal) velocities.

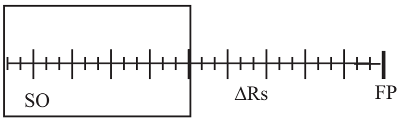

Figure 2 Fix point outside of SO

The definition of a fix point (and the velocities connected with that) meets exactly the statement, that OAs are independent SOs. With the help of the fix point, though, some considerations and calculations can be carried out better. It can be easily shown mathematically (will not be done here for space reasons) that for every length change a fix point can be defined. Particularly for overlappings in one straight line this is very easy. In the perpendicular case the distance markings enter the OA simultaneously and, of course, not all of them can get the same additional speeds at the same time since then they wouldn't move relatively to each other. Many different processes are here conceivable, e.g. with differently great speeds or with time changing speeds etc. The use of fix points, which are perpendicular to the velocity, also is often helpful. Here, though, it isn't necessary to go into the details of every special case since here it is about to work out the general connections (facts).
The fix point is primarily of importance in practice if it is not in infinity.

Now still something about the speed of the OA. In principle the speed with which the distance markings of a scale connected to an OA move (the speed of the space as such of the OA is meant) has to be distinguished from the speeds with which the OA *spreads* (expands). An example to this will be calculated right in the following chapter for overlappings in one direction. At overlappings with motions perpendicular to each other it has to be taken into account that a space point of the OA can always move only in one direction in principle. If the Rs values change in two perpendicular directions then the arising speeds of the distance markings of the OA of every direction simply are added up (even if sometimes this is not very uncomplicated).

1.3 General overlapping example

Here now the overlapping of two SOs, which move along the same straight line, will be calculated briefly. (see Figure 3) The SOs SO1 and SO2 move with V1 and V2 and have the values Rs1 and Rs2. In the OA the Rs values of SO1 and SO2 change in Rsi what means that the speeds of this length changes must be added up to the original speeds of the SO1 and SO2 (that are V1 and V2) from which the speed of the OA (that is Vi) arises. From Vi and Rsi then the speeds with which the OA spreads result (see U1 and U2), that are the speeds with which the OA overlaps SO1 and SO2.

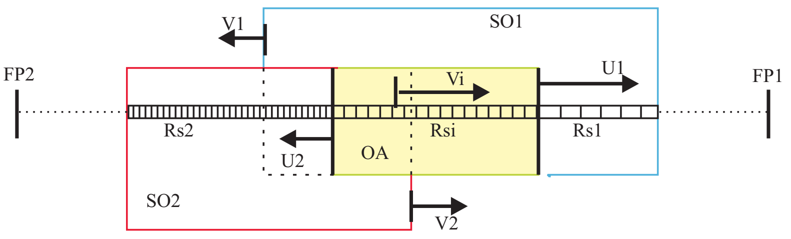

Figure 3 Overlapping of two SOs

For the overlapping of SO1 arises: $\frac{Rs1}{Rsi}=\frac{U1-Vi}{U1-V1}$ (Equation 1.a) and for the overlapping of SO2 arises: $\frac{Rs2}{Rsi}=\frac{U2-Vi}{U2-V2}$ (Equation 1.b).
These two equations show the dependence of the spreading speeds of the OA (here this are U1 and U2) from its Rsi value and from its own speed (Vi). So, if e.g. Rsi and Vi are known then U1 and U2 can be calculated and, of course, the other way round this goes also.
In Figure 3 two fix points (FP1 and FP2) can be seen. The meaning is that: The Rs value-change of SO1 (and the additional speed connected with that) is ended as soon as the U2 of the OA has reached the FP1. The analogous applies to RO2. It has to be taken into account here that FP1 and FP2 can be on both sides of RO1 or RO2 in principle and that FP1 and FP2 can move correspondingly with V1 and V2. If FP1 and FP2 are not in infinity then the overlapping causes only a shift (and not a permanent velocity) of the overlapped areas of RO1 and RO2, which is proportional to the Rs value change and to the distance of the fix point.
Here, however, a further important aspect reveals now: If the fix point is far outside the SO, then the OA (and the overlapping respectively) will reach the end of the SO sometime. E.g. U2 will reach the end of SO2 at Figure 3. What happens then? Let us recapitulate: Initially SO1 and SO2 have moved independently of each other being far away from each other. Then SO1 and SO2 met and formed the common OA. The OA is by definition a proper SO of its own (with its own speed and its own Rs, Rt and Rts values). If, now, the OA reaches the end of e.g. SO2 then in the following the OA will overlap with the space area, which is behind SO2 (that can be e.g. the space area, which surrounds SO1 and SO2). This overlapping of the OA with a SO outside the SOs of the (first) overlapping is a completely *new* overlapping! Of which kind this recent (new) overlapping will be (therefore e.g. into which Rs value the Rsi value will change or which the new Vi will be) depends only on the special conditions of this (new) overlapping and is generally independently of the possible, previous overlappings. This aspect of the overlapping is particularly important. It shows e.g. that there isn't any general symmetry with respect to the beginning and the end of an overlapping. Also, the permanent new emergence of new SOs arises from this. And finally arises the possibility for numerous very complex overlapping processes with many interleaved, mesh with each other overlappings.

1.4 Reflection

One recognizes at Figure 3 that Vi is contrary directed to V1. This can be understood as that the motion direction of SO1 is reversed due to the overlapping (therefore in the overlapped area). This has the meaning of a reflection. This becomes even clearer if at equation 1.a it is set Vi=V2, which initially is unproblematic. If, though, it is Vü=V2 then this means that the speed of SO2 doesn't change at the overlapping, what means that Rs2 also cannot change. One could think now that this is reflected into equation 1.b, were for Vi=V2 follows Rs2/Rsi=1. This, though, would mean that Rsi must have the value of Rs2 what, however, cannot be valid since Rs2 can be changed into any arbitrary value at the overlapping. The problem is solved if one considers that it also must be U2=V2, if Rs2 doesn't change. Because then it is Rs2/Rsi=0/0, which is indefinable. This means that in this case there doesn't have to be any fix connection between Rs2 and Rsi. If it is Vi=V2 then the OA won't leave SO2. This corresponds in principle to a collision between SO1 and SO2 at which the collision partners remain together after the collision (here, though, the V2 of the one collision partner doesn't change). Here, it is important to see that an overlapping at which one of the overlapping partners remains unchanged is possible. The overlapping actually takes place only at the surface of the not changing SO. (It is as if the touch of the surfaces of SO1 and SO2 does trigger the transformation of SO1 with U1 while SO2 remains unchanged.)
If, now, at this process of surface overlapping it would be Vi>V2 then the OA would leave SO2 immediately after the touch between SO1 and SO2. Here then the touch would have triggered the transformation and reflection of SO1 at SO2.

The surface with which the OA moves through SO1 can be named overlapping surface. So, the overlapping surface changes the Rs value of SO1 into the Rsi value. Here, compression always takes place at reflection. One recognizes this by this that the distance markings of the scale connected to SO1 must change their speed at the reflection what for they move on to the distance markings, which haven't changed their speed yet.

At next it will be now shown that there still is another kind of reflection, which isn't connected with compression mandatorily. At this, then the connections regarding the reflection at the touch surface, as just described, will get more understandable, too.

It is now that SOs can be reflected at a surface similarly as light or sound waves. Here, a side turn round takes place, which means that in these cases a sign must be assigned to the Rs value. To understand this better, another fact must be explained about overlappings.

It was already explained that the beginning and the end of an overlapping are two different, generally independent of each other overlappings. This is so because the OA is a SO of its own with its own overlapping characteristics. Let us have now once again a look at a simple (basic) overlapping process. Two SOs meet and at the moment of their touch the OA starts being formed. If one takes it very exactly, then, now, at the next moment the two SOs won't overlap with each other any more but they both will overlap with the just now newly produced OA; and since the OA is a proper SO of its own with its own overlapping characteristics, this overlapping of the SOs with the OA will produce a new OA. This continues continuously so that a very inhomogeneous OA can arise. Even a completely chaotic SO can arise theoretically. On the other hand such an overlapping is also a very continuous and proceeding evenly process so that it seems natural that also well calculable SOs (therefore OAs) arise from it. Even homogeneous OAs seem absolutely justified although we know now that this then are special cases of overlappings. The calculability of overlapping courses reflects here the calculable part of our world.

So we see that there can be very manifold and complex overlapping courses. The reflection with side turn round is already such a case. Here a SO (SO1) meets the surface of another SO (SO2) where the OA is formed immediately. This OA, now, causes the speeds of the distance markings of the first SO being turned back (and getting greater than that of the second SO), and the speeds of the second SO remain unchanged. The distance markings reflected this way belong, therefore, to another OA, which is to be distinguished from the OA, which has been formed at the surface of the second SO. For this reflected OA, now, it is characteristic that it does not form a new OA at the overlapping with the oncoming first SO - therefore, this overlapping remains resultless (just as at a reflected electromagnetic wave) - and that for the not yet reflected part of the first SO continues to move toward the surface of the second SO and is reflected there. At this kid of a reflection the sign of the Rs value of the reflected SO changes; the amount of the Rs value and the speed of the SO can be arbitrary in principle (so there isn't a compression mandatorily). One recognizes here that SOs can (as already mentioned) interact in many more manifold ways then material objects can. One recognizes here also that numerous more overlapping courses still can be found, which yield reflections. Reflections for their part contain the possibility of oscillation, in principle.

A very basic example of an oscillation is a small SO (SO1), which is inside a larger SO (SO2). (see Figure 4) It is, of course, possible that SO2 is resting for the observer. When SO1 reaches the surface of SO2 from inside, then this means that an overlapping of SO2 with the SO which surrounds SO2 is taking place - in Figure 4 this is SOu. This overlapping of SO1 with SOu also, of course, can result a reflection. Ultimately SO1 can swing to and fro inside SO2, always reflected at SOu. SO2 doesn't have to change here at all. If one couldn't be aware of SO2 now, then it would even look as if SO1 would swing freely, without outer influence.

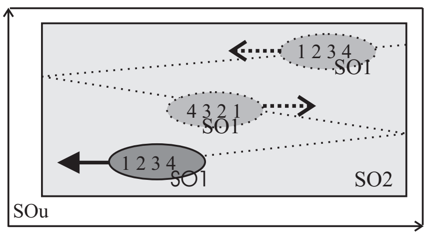

Figure 4 Oscillation by reflection

Naturally, oscillation courses can be arbitrarily complex. (Here then, many different SOs are involved.) It was already mentioned that the point of view supported here is this that matter does consist of complex, highly structured accumulations of SOs. Here now we see how these complex accumulations do hold together. Ultimately innumerable, interleaved strongly, meshed oscillations take place. That it had to come to such accumulations at all gets clearer, if one considers that at the SOs there must always be also oscillation courses at which the oscillation partners approach more and more by every oscillation. So there are accumulating oscillation courses. (For space reasons, examples are renounced here.) Concurrently, we have seen that the formation of an OA doesn't result mandatorily in the extinction of the overlapping SOs. Therefore, new SOs can arise permanently in principle in a restricted area *without* the already existing SOs being lost (extinct). At more complex structures, indeed, all SOs will be in permanent change. This permanent new emergence of SOs gets clear, if one imagines very many SOs in a small area, which all interact with each other (primarily by swinging), and if one considers that the SOs (or OAs) arising from this area can be very large and very fast so that they will interact very, very often. Here, it has to be taken into account, as mentioned already, that the beginning and the end of an overlapping are two different overlappings.

So, in principle new SOs can arise permanently at SO accumulations in a great, unlimited number, what causes that the accumulating oscillations don't extinguish themselves either - what could be thought, since their SOs do approach more and more. Actually, such a height structured and complex SO accumulation can permanently produce and emit new arising SOs in a large number without losing complexity or "substance". So one can imagine well that in this way the universe fills with SO accumulations. Our material world (and its structure respectively) finally arises from the equilibria between the oscillation and interaction courses at the SO accumulations and the new emergence of SOs taking place permanently at this courses. Here, not only the structures of the elementary particles become defined but also those of the atoms and in the end (by gravitation) also those of the macroscopic world. (Gravitation arises here because the SO accumulations emit (and absorb) permanently many SOs - but this will be examined later more exactly.)

1.5 Continuous shifting and acceleration

The fix point has primarily then practical meaning, when it isn't in infinity, as already mentioned, because then a SO is only shifted relatively to the fix point by a overlapping. If the SO is overlapped completely and uniformly by a considerably bigger SO then one can imagine that it keeps its form and size more or less despite the overlapping; only its Rs value will change in the direction of the fix point and cause the shifting. (see also Figure5) This, of course, is only a special case - within the multitude of possible overlapping courses. Then, following, the SO (at Figure 5 this is SO1 or SO2) can be overlapped again uniformly by a relatively big SO (in Figure 5 SOA or SOB) in such a way that the first Rs value-change is reversed. This way the SO wouldn't have changed at all. If, though, the fix point is on the opposite side of the SO at the reversal of the Rs value-change than as at the (first) production of the Rs value-change, then the shifting will have the same direction at the reversal as at the production (this is indicated at Figure 5 by FP1 and FP2). If the SO is stretched and compressed continuously in this way then a continuous shifting in one direction takes place. (Here it has to be mentioned again that the beginning and the end of a overlapping are different overlappings, and that the fix point can be at different locations, indeed.)

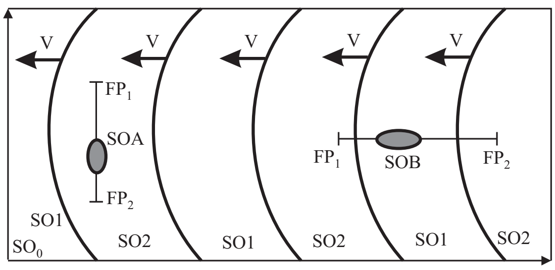

Figure 5 Continuos overlapping

Of course, in this example the fix points can also be respectively in infinity. Then each of the alternating overlappings will cause an additional speed in the same direction, which in the consequence is acceleration.
What is it about in this example? Well, essentially it is about, that instead of the SO one can also imagine a (perhaps very small) material object (e.g. an elementary electric charge) and instead of the overlapping SOs (in Figure 5 these are ROA and ROB) one can imagine space waves (e.g. electromagnetic waves). So, in the end one imagines that *resulting* Rs, Rt and Rts values can be assigned to material objects also. If

resulting Rs, Rt and Rts values can be assigned to a material object then it can be influenced by SOs, too. Here, the fix point could have the meaning of inertia for material objects: the nearer it is to the centre of the material object, the bigger inertia is. [10] [11] [12] [13]
It has to be taken into account that in our macroscopic world in many cases the conditions of the SRT are valid. This also has to be reflected in the Rs, Rt and Rts values of the material objects. This leads us automatically to the important question about the size conditions, which we have at SOs generally.
At first the following is to be said about size conditions: Since, in the end, the SOs are space only, SOs can be in principle arbitrarily large and, more important, also arbitrarily small. It is now that our universe has emerged meshed and strongly connected structures and physical laws and the question arises, which types of SOs are finally represented in it. In this paper the opinion is held that already elementary particles (such as electrons, protons, neutrons, quarks etc.) consist of very many, highly structured accumulations of SOs. In addition, though, there can be also macroscopic phenomena, which are caused by macroscopic SOs. So e.g. at the phenomenon of interlaced photons there could be involved SOs, which aren't tied to the SRT conditions, which therefore can have an over-light speed effect.

1.6 Deformation and rotation

At deformations and rotations the observation location is important. (General considerations arising for SOs by the observation location are treated in detail in the next chapter.) Here, the following, fundamental statement is important: The space within a SO has to be regarded always as absolute for an observer who is inside the SO.
So, if a SO is deformed by an overlapping then the (imaginary) inside observer is co-deformed, what means that from his point of view himself and his SO haven't been deformed, but that the surroundings have been deformed (from his point of view). Among others a deformation can be the change of the angle of the coordinate axes. (Such changes (deformations) of the coordinate systems can arise, if the overlapping surfaces and/or the fix point surfaces (because taken exactly, three-dimensionally the fix point, therefore, is a surface, of course) aren't even or if they are not perpendicular to speeds caused by the Rs value changes.)
The same principle applies to a rotating SO (generally): The space of a rotating SO is absolute for an observer affiliated to the SO and this means that this observer does not regard himself as rotating. Instead the surroundings rotate around his SO. Inside the SO (which is rotating, seen from outside) there is no centrifugal force and a light beam (if it could be produced by the SO) propagates on a straight line there. This type of rotation can be labelled *relativized* rotation, since it isn't ascertainable absolutely but only relatively to other reference systems - just as the steady (constant) rectilinear motion.
In our macroscopic world a rotation is obviously measurable by numerous phenomena: centrifugal forces, trajectory bends, pendulum oscillations and others. We had noticed now that under circumstances resulting Rs, Rt and Rts values also can be assigned to macroscopic, material objects. If this is so, then also macroscopic, material objects should have at least the ability to carry out relativized rotations at least partly. Such relativized rotations should be then taken into account at calculations. This can apply to rotations inside atoms as well as to rotating discs, known from experiments about the magnetic gravitation. Also the solar system as a whole or single planets or moons can perhaps execute at least partial relativized rotations relatively to the stars; this part of relativized rotation then must be taken into account at the calculations of the trajectory bends and rotations and at the masses and centrifugal forces of the planets, since otherwise apparent deviations may arise. [14] [15] [16]

2. Observation location

At the considerations about the observation location here it is primarily all about observers (and their coordinate systems respectively) who move relatively to each other and who have different Rs, Rt and Rts values. Caused by the relative motions and the differences in the Rs, Rt and Rts values the observations (e.g. of phenomena) can differ considerably.

Primarily, though, the analysis of the observation location yield criteria about the OA, therefore, about the way overlapping courses can happen.
The conversion of time and length between two inertial systems moving relatively to each other is given in the SRT, in the end, by: $t' = t * \sqrt{1-\left(V/c\right)^2}$ and $S' = \frac{S}{\sqrt{1-\left(V/c\right)^2}}$ (were t´ and s´ are the time and the length of the system moving with V and c is light speed). Since, though, the conditions of the SRT aren't generally valid for SOs any more, also more general conversion equations have to result, of course. These more general equations and some of the consequences, which arise from them, shall be shown here briefly.
For the following conversions it is set: Q is the label for the resting inertial system and Q´ is the system moving with velocity V. Q´ has the values Rs, Rt and Rts, seen from Q. (Here, not only Rs and Rt have a sign but also Rts. It is valid: Rts>0, if time increases in the positive coordinate axis direction.) Now the values will be calculated, which Q has from the point of view of Q´, therefore, Rs´, Rt´and Rts´.

2.1 Rt´, Rs´ and $\vec{R}ts'$

To find Rt´, the course of time at *one* place in Q is compared with the course of time at the different places in Q´, which are respectively opposite (next to) the place in Q. At Q´ passes the time $\Delta t' = \Delta t * Rt - \Delta t * \vec{V} * \vec{R}ts$ were Δt is the time in Q and $\Delta t * Rt$ is the time at *one* place in Q´, and $\Delta t * \vec{V} * \vec{R}ts$ is the time difference, which results because of $\vec{R}ts$ between the initial and final measuring place. So it is valid: $\Delta t' * Rt' = \Delta t \Rightarrow \Delta t * \left(Rt - \vec{V} * \vec{R}ts \right) * Rt' = \Delta t \Rightarrow Rt' = \frac{1}{Rt - \vec{V} * \vec{R}ts}$

For $\Delta t > 0$ and $\left| \Delta t * \vec{V} * \vec{R}ts \right| > \left| \Delta t * Rt \right|$ it is $\Delta t' < 0$ and therefore it is also Rt´<0. This means automatically that it has to be $V' \neq -V$ (if it is Rts´>0). In other words: For SOs the relativity of velocity is not valid (as it would be also for observers with corresponding Rs, Rt and Rts values).

In an analogous way arises: $Rs' = \frac{Rt - \vec{R}ts * \vec{V}}{Rs * Rt}$.

It has to be taken into account that it can be Rs<0 (and Rs´<0 respectively). A Rs<0 means the inversion of the direction of *lengths* in dependence of the observation location. So, if there are two equal directional objects (or SOs) with different velocities at Q, then these can be contrary directional at Q´. In other words: also the form of SOs depends on the observation location to a certain extent.

At last arises (also in an analogous way): $\vec{R}ts' = -\frac{\vec{R}ts}{Rs * Rt}$

2.2 v_m'

It becomes even more interesting, if we introduce a third inertial system (m), which moves relatively to Q with the velocity v_m. Which velocity does m have from the point of view of Q´? (Therefore, which is v_m'?) For that, of course, the distance covered by m at Q´ must be divided by the time passed meanwhile at Q´. Under consideration of Rs´, Rt´ and Rts´ arises: $\vec{v}_{mx}{}' = \frac{\left(\vec{v}_{mx} - \vec{V}\right) * Rs}{Rt + \vec{R}ts * \left(\vec{v}_{mx} - \vec{V}\right)}$,

$\vec{v}_{my}{}' = \frac{\left(\vec{v}_{my} - \vec{V}\right) * Rs}{Rt + \vec{R}ts * \left(\vec{v}_{mx} - \vec{V}\right)}$, $\vec{v}_{mz}{}' = \frac{\left(\vec{v}_{mz} - \vec{V}\right) * Rs}{Rt + \vec{R}ts * \left(\vec{v}_{mx} - \vec{V}\right)}$ and of course $\vec{v}_m = \vec{v}_{mx} + \vec{v}_{my} + \vec{v}_{mz}$.

If m rests at Q (therefore $v_m = 0$), immediately results: $V' = -V * \frac{Rs}{Rt + \vec{R}ts * \vec{V}}$. This is the already mentioned inequality of the relativity of velocity for SOs.

Because of Rt and primarily of Rts m can move in such a way that it always is at the same instant of Q´ but not at the same place of Q´. So, m moves relatively to Q´ without time passing at Q´ at the place of m. This is valid for $v_{mx} = V - \frac{Rt}{Rts}$. The velocity of m is here infinitely great at Q´ (viewed by Q´). If, therefore, m has the suitable velocity at Q for a limited Δt and ΔS then at Q´ it just jumps over the distance ΔS on instant. Therefore it is simultaneously at all points of this ΔS -distance.
So we recognize here: If the conditions of the SRT aren't valid any more for the Rs, Rt and Rts values then infinitely great velocities arise automatically for some observers although they don't move with infinitely great velocities for their part. So SOs can have infinitely great velocities in principle. This means that SOs can appear for an observer at any time and at any arbitrary place suddenly and unexpected (as this would be the case here for an observer at Q´ at the end of the distance ΔS, if ΔS would be great enough).

The conditions of the SRT result, if $v_m = v_m{}'$ and $V' = -V$ are demanded. In addition to the Rs and Rt values of the SRT conditions results: $Rts = -\frac{\left|\vec{V}\right|}{\left|v_m\right|^2 * \sqrt{1 - \left(V / v_m\right)^2}}$ of SRT conditions.

In a similar way as Rs´, Rt´ and Rts´ were calculated, it is also calculated, which Rs, Rt and Rts values m has viewed from Q´, therefore Rsm´, Rtm´ and Rtsm´. It results: $Rtm' = \frac{Rtm}{Rt + \vec{R}ts * \left(\vec{v}_m - \vec{V}\right)}$,

$Rsm' = \frac{Rsm * \left(Rt + \vec{R}ts * \left(\vec{v}_m - \vec{V}\right)\right)}{Rs * Rt}$ and $Rtsm' = \frac{Rtsm * \left(Rt + Rts * \left(v_m - V\right) - Rts * Rtm\right)}{Rs * Rt}$. The values calculated here are valid for relative motions in one direction.

2.3 Backwards running time (explosion example)

We have seen that for a certain Rts and Rt (of a system Q´ moving with V) an object m, moving with the velocity v_m, can have an infinitely great speed, viewed from Q´. This is particularly valid if Rt>0, Rts>0 and V>0. (At the SRT here it had to be Rts<0.) Rts and Rt can actually have such values that m moves backwards in the time of Q´ - in dependence of v_m, naturally.
This case gets particularly interesting, if one looks at an explosion. The explosion particles produced at the explosion may spread spherically at Q. An explosion does mean here nothing else but the change of the velocities of the explosion particles - and they do change in all directions.
Rts and Rt of Q´ can be chosen now as following: Before the explosion happens the explosion particles (being still together) move backwards in the time of Q´. (This is also possible, if the explosion particles

rest at Q before the explosion happens.) After the explosion at Q some of the explosion particles will have an infinitely great velocity in Q´, what means that they always are on the same instant of Q´. Some of the explosion particles will move even faster backwards in the time of Q´ after the explosion, and some will, caused by the velocity change, now move forwards in the time of Q´.
It is interesting here now that this explosion appears to be completely different viewed by Q´ than by Q. For the elucidation we also regard the proper times of the explosion objects, which proceed forwards at Q (all in the same way, indeed). Those explosion particles, which move even faster backwards in the time of Q´ after the explosion (as viewed by Q), do move towards the explosion place viewed by Q´. (Their proper time proceeds backwards viewed by Q´.) There they accumulate at the instant of the explosion. In addition, on the instant of the explosion the remaining explosion objects also appear, viewed by Q´ - this are those, which move forwards in the time of Q´ (as viewed by Q). After the explosion they move away from the explosion place - and their proper time proceeds forwards, viewed by Q´. In addition, on the instant of the explosion at Q´ the unexploded, still intact explosion object also arises, since this was moving backwards in the time of Q´, viewed by Q. Here, the proper time of the intact explosion object proceeds backwards viewed by Q´. So, the explosion particles arising on the instant of the explosion at Q´, with their proper time running forwards, exist simultaneously (viewed by Q´) with the intact explosion object, which, naturally, also contains these particles - but here with their proper time running backwards. So, viewed by Q´, at the instant of the explosion *couples* of particles appear as from nowhere whose proper time courses run in contrary directions. This happens because these particles change their velocities at Q in that way that they change their time direction at Q´, viewed by Q. If, here, the space area of Q´ represents the laboratory conditions then one would have an explanation approach for the pair creation of matter. [17] [18] It may be mentioned briefly that the particles, which have the infinitely great velocity at Q´, form a cone whose angle is containing the motions of the explosion particles. This can be seen also at Figure 6 in which the explosion is represented qualitatively as it is viewed by Q´. The corresponding calculations are left out for space reasons here - they don't provide any additional cognition, either.

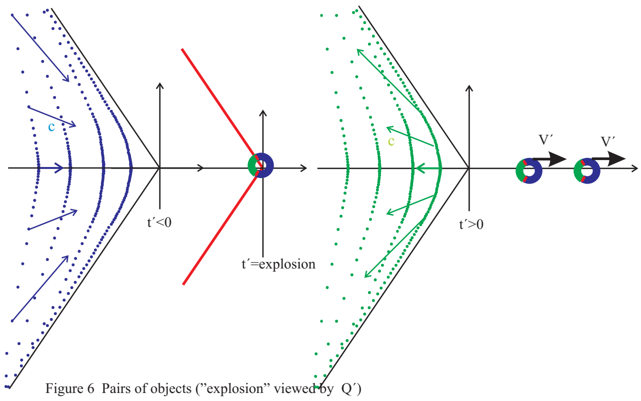

Figure 6 Pairs of objects ("explosion" viewed by Q´)

2.3.1 Folding

So we have seen that one SO can exist at two different places on the same instant (here viewed by Q´). Such double existing SOs can be labelled as double objects. If, now, an observer is inside one of the double objects then he also is inevitably in the other one, since it anyway is the same SO viewed by Q. If, now, this observer is moving inside the one of the double objects (viewed by Q´) then he also is moving automatically in the other one in an analogous way - under consideration of the course of the proper time, indeed. Viewed by Q this observer will also be moving correspondingly, of course. What, though, if the observer being inside one of the double objects (viewed by Q´) is influenced *from outside* and if he changes caused *by this influence* (e.g. moves)? One must assume almost inevitably here that the observer inside the other double object is influenced automatically in an analogous way - since it is anyway the same (one) observer, viewed by Q. Such a long-distance effect corresponds exactly to the folding of photons in principle. In the third part it is described that also photons (as matter) consist of accumulations of SOs interacting with each other. At the creation of a couple of interlaced photons these two accumulations also get (among others) SOs, which are double objects, and each of the two interlaced photon accumulations always contains one of the two double objects respectively. So, influencing one of the photons influences automatically also the other one. Here, though, the proper time of the double objects has to be taken into account: that of one of the double object partner runs forwards, that of the other one runs backwards. Therefore, so to speak, one can influence either the future or the past of the double object. So, if one wants that the influence is seen also at the counterpart, well, then the *past* partner must be influenced. This means that each of the two interlaced photons must contain at least one double object partner of the past while the other photon contains the double object partner of the future respectively. In this way each of the two interlaced photons can be influenced through the other respectively. We remember: Photons consist of many SOs (therefore SO accumulations) and that for they also can contain several double object SOs.

It can be noticed generally that this double existence of a SO increases the complexity of the interactions of SOs considerably. The number of possible interactions and their courses increases drastically. An example was just described.

2.3.2 Spontaneous new emergence of SOs

The spontaneous appearance of double objects at Q´ ultimately is explained by the fact that the velocity of the SO is changed at Q. Such a velocity change can be caused by a collision or by a overlapping. So, by every collision or overlapping new SOs emerge spontaneously for some (other) observers. These new SOs can interact for their part and cause velocity changes. In this way more and more SOs can arise newly - partly also by mutual influence with respect to the observation systems. We have seen in the first part that even without the consideration of the observation location SOs (and SO accumulations respectively) can produce and emit permanently new SOs just because of their manifold interaction possibilities (e.g. oscillations). Now we see that under consideration of the observation location this must happen almost inevitably. This supports strongly the idea that matter, such as electrons and protons, is interacting by emitting (and absorbing) permanently SOs, which permanently arise newly.

In addition, here, an important, far-reaching mutual influenceability and dependency - also in the meaning of an interaction - arises between the parts or the particles of matter by which all matter is connected with each other, e.g. by double objects. The field of an electric charge e.g. still can be coupled to its electric charge although it can move independently of its electric charge. This may also be of importance, when considering the states of plasma (to this, the chapters 3.6 and 3.7 may also be interesting).

Another interesting aspect is here that SOs can appear spontaneously also as a whole - therefore not by extending gradually. Something similar we have already seen at the infinitely great speed of SOs. If a SO appears as a whole spontaneously then it can overlap with some other SO as a whole in the same moment, too.

So, overlappings of SOs don't have to proceed continuously.

If a SO is overlapped immediately as a whole then it also is changing its velocity immediately as a whole, too, and therefore it can appear spontaneously (e.g. as a double object) to some other observer as a whole and cause analogous overlappings for its part.

At the considerations made in this chapter about the observation location, particularly under consideration of the spontaneous new emergence of SOs, the idea imposes itself that in this way the universe has created itself out of itself. As if it has created itself out of its existence.

2.4 The transformation of an overlapping to other observers

At an overlapping the Rs value-changes and the velocities depend on each other in accordance with the equations 1.a and 1.b. The question is now: If the Rs values and the velocities of the overlapping SOs and the OA are transferred with the help of the transformation equations into another observation system (e.g. from Q to Q´), is then the overlapping in Q´ also in accordance with the equations 1.a and 1.b? This ought to be so. So, if $\frac{Rs1}{Rs\ddot{u}} = \frac{U1 - V\ddot{u}}{U1 - V1}$ (1.a) is valid, is then $\frac{Rs1'}{Rs\ddot{u}'} = \frac{U1' - V\ddot{u}'}{U1' - V1'}$ also valid? Inserting yields coherence! (For 1.b it is the same, of course.)

So, as different as an overlapping may seem to be from the view of Q and Q´, no contradictions at all arise at the transformations.

2.5 Conservation law for the interactions of SOs

If two SOs, which have the same Rs, Rt and Rts values, overlap each other then one could assume that the OA will also have the same Rs, Rt and Rts values (particularly if that were Rs=Rt=1 and Rts=0). Since, though, these SOs do overlap each other they must have different velocities, of course. Actually, exactly due to their different velocities they will have different Rs´, Rt´ and Rts´ values, after being transformed into another observation system (e.g. from Q to Q´, where Q has the velocity V and the values Rs, Rt and Rts). So, viewed by Q´ the two SOs have different values. If, though, SOs, which have different Rs, Rt and Rts values, overlap then the OA cannot adapt by no means the Rs, Rt and Rts values of all the overlapping SOs, since it can have only one value configuration - as every proper SO. This means that the OA will get some (arbitrary) other Rs, Rt and Rts values (which appear as described in part 1) at Q´ than the SOs have, which are overlapping there. If, now, these values, which the OA has in Q´, are transformed back to Q again then the OA will also have generally other Rs, Rt and Rts values at Q than the SOs overlapping there - which (SOs), of course, have the same Rs, Rt and Rts values at Q.
Summarized: Even if SOs overlap, which have the same Rs, Rt and Rts values, the OA will generally (therefore except for exceptions) have nevertheless different (new) Rs, Rt and Rts values. That this must be so is also recognizeed by the fact that the OA must have in every case its own velocity, which cannot agree simultaneously with the different velocities of the overlapping SOs.

This example was one of the attempts trying to find conservation laws (as the conservation of momentum) for the interactions of SOs (therefore for overlappings). Here, the thought was that the SOs divide after the overlapping again and that they have the same Rs, Rt and Rts values before and after the overlapping (not during the overlapping). Only the velocities have changed here by the overlapping. Now it only needs a criterion that determines the velocity changes. This could be a quantity similar to inert mass. From this then the following procedure arises: If one has two SOs, which are *going to* overlap, then one seeks that reference system in which both SOs have the same Rs, Rt and Rts values. There then one can predict the velocity changes (therefore the overlapping course) due to the SO inertia (mass), and then the corresponding values can be transferred (recalculated) back to the original reference system. The calculation of the OA doesn't arise here yet, though, because merely the state before and after the overlapping is examined.
The interaction of the SOs in that system, in which they have the same Rs, Rt and Rts values, can be labelled as interaction with conservation of SO momentum. If the velocities and the Rs, Rt and Rts values of this SOs are converted to another reference system and if conservation of SO momentum shall be also valid there then there other SO masses have to be assigned to the SOs - due to the conversion of the velocities. Since, concurrently, the Rs, Rt and Rts values are also converted, it seems reasonable to associate the SO inertia with the Rs, Rt and Rts values. This is seen also in this: In that reference system, in which the SOs have *different* Rs, Rt and Rts values, one changes these values by *imaginary overlappings* both before and after the real overlapping in that way that they become equally. Here then both the Rs, Rt and Rts values and the velocities of the SOs change - the velocity changes are caused by the Rs value changes. If, here, one selects exactly the same values for the Rs, Rt and Rts values, which the SOs had in that reference system in which their Rs, Rt and Rts values were anyway equally, then here conservation of SO momentum arises again - in perfect conformity. (The conformity of these two calculation methods can be derived exactly - by using the transformation equations.)

In which way inertia can be assigned to SOs due to their Rs, Rt and Rts values, is here still not clear. In principle, it must be taken into consideration that perhaps the conservation of SO momentum (even if it is valid in one reference system) isn't always valid at the conversions in other reference systems. This is particularly valid, if one takes material, macroscopic objects, to which Rs, Rt and Rts values have been assigned, instead of SOs. If, so, the conservation of SO momentum isn't valid at the conversion in another reference system now, then there is this interpretation: By imaginary overlappings the Rs, Rt and Rts values of all SOs involved are converted in that way that for all of them Rs=Rt=1 and Rts=0 is valid. Here, then, the velocities of the SOs change by the Rs value change. For these SOs, which are converted

(imagined) in such a way, conservation of SO momentum is *defined* to be valid, now. The difference of SO momentum between the imaginary SOs to the really existing SOs is explained then by considering that SOs receive additional SO momentum caused by Rs, Rt and Rts value-*changes*. These additional SO momenta, which can arise at overlappings and by conversions into other reference systems, don’t always meet the conservation of SO momentum. This becomes particularly intelligible, if one simply looks at a single SO whose velocity changes without its Rs value changing. If the Rs value doesn't change, this means that the velocity change starts simultaneously at all points of the SO. Viewed from another reference system, however, the velocity change won't start simultaneously at all points of the SO, due to the Rts of this reference system. This means that in this reference system together with the velocity change the Rs value of the SO also will change. It is exactly this additional Rs value change (that isn’t happening in the original reference system) that can contain an additional SO momentum.
Summarized: The conservation of SO momentum is superimposed by SO momenta, which arise by Rs, Rt and Rts value-changes.
Here it is essentially all about the velocities, which arise from the Rs value changes and which superimpose the conservation of SO momentum.
Formulated more descriptive: The conservation of SO momentum shows that SO momentum can arise newly from space and time and that SO momentum can dissolve into space and time.
If one transferes this to material, macroscopic objects, one could say that momentum and energy can be converted into space and time, and space and time can be converted into momentum and energy. So, at the conservation of momentum and energy the momentum share and the energy share from space and time must always be taken into account.

As interesting as the approach to a conservation law for SOs introduced here may be as difficult it is to concretize it. SOs can interact in most various ways. Every overlapping changes into other overlappings. New SOs permanently arise while others are dissolving. Which of the SOs and which of the overlappings is to be assigned to a certain conservation of SO momentum now? More detailed statements to this are probably only reasonable, when it has been achieved to define (to find) concrete, real SOs. [19]

2.6 Unilateral overlapping

At the end of part 2 another two interesting cases will be presented briefly.
One can imagine easily a smaller SO moving into a larger (e.g. resting) SO. Here now, the smaller SO will not change its Rs, Rt and Rts values, and the larger SO doesn't change either (except, of course, exact there where the smaller SO is overlapping). Is such a process possible?
If the smaller SO doesn't change by entering the larger SO then the area of the smaller SO represents automatically the OA. This OA therefore has the same Rs, Rt and Rts values, the same form, and the same velocity as the smaller SO. This, though, would mean that the values of the larger SO must change in an analogous way. That this is not possible can be realized most simply, if one imagines that the larger SO rests. If one then tries to move the distance markings of the larger SO in that way that an OA being identical with the smaller SO arises, this fails. However, one can imagine that the distance markings of the larger SO are all compressed at the front-sided surface of the smaller SO. There then the Rs value is infinitely great. In this way such a overlapping still becomes possible after all. It although seems strange and arbitrary. On the other hand there can certainly be found an observation system (with appropriate Rs, Rt and Rts values) from which the same process seems fundamentally more plausible and from which it seems as a very normal overlapping (so, e.g. it can be that the Rs value at the front-sided surface of the smaller SO isn't infinitely great there).
We recognize here that also strangest overlapping courses are possible, and we recognize how important the observation location is.

2.6.1 Tangential Rs, Rt and Rts values

Sometimes it can make sense to assign tangential Rs, Rt and Rts values to rotating reference systems. From this numerous interesting aspects arise. One of them is this: The Rs, Rt and Rts values of two reference systems, which are rotating against each other, are chosen in that way that one single light beam propagates straightway in both systems and it has light speed in both systems. Here then we get also for rotations a constant quantity to which we can refer, similarly as in the SRT.

3. Matter and its interactions

In this chapter it is particularly all about to show how the concept of the SOs can be used for describing matter and its interactions. With the help of examples the efficiency of the concept gets clearer; among others it is shown that it doesn't come to any contradictions with the SRT.

3.1 General remarks

It was already described repeatedly that SOs can form highly structured accumulations consisting of many interacting SOs. These highly structured SO accumulations are the basis of matter. Immediately the question arises, how big are these SO accumulations then? Well, in principle space as such can have any size, it can be arbitrarily big or small. This means that SO accumulations may occupy arbitrarily (very) small space in principle. They even may be many orders of magnitude smaller than e.g. a quark. And even that could be big. On the other hand, such size conditions always depend also on the speeds with which the interactions take place. Therefore, the size relationships of the world known to us (and being accessible) arise very fundamentally from the magnitude of light speed. This concerns both astronomical objects and elementary particles. I will treat the light speed in greater detail later. In principle, though, the entire universe as known to us could be a tiny sub-structure (a kind of "quark") in a bigger universe in which the interaction speed would have an appropriately other magnitude.

Now, the interactions of the SO accumulations take place by emitting and absorbing SOs. This is possible because, as described at part 2, SO accumulations can permanently produce newly and emit continuously large numbers of SOs without, though, losing "substance". That the SO accumulations do exist means that the numerous SOs and their interactions inside the SO accumulations are in a kind of equilibrium. The permanent emission of SOs could here be (a necessary) part of this inner equilibrium. Now, it is decisive for the interactions that the absorption of a SO by a SO accumulation can cause some change at this accumulation. Of which kind or intensity this change will be, can't be answered generally, but velocity changes are naturally of special importance.

So, matter consists of SO accumulations, which permanently emit SOs in large numbers. This means that the space between matter is also filled with many SOs. In the end, the transition from a SO accumulation to the SOs, which are surrounding this accumulation, is fluent. The SOs between the SO accumulations also can interact with each other, at least in principle, and by doing so they also can form SO accumulations again, which, though, can be of completely different kind than the SO accumulations of matter. Here, the picture (idea) arises, that the space between the SO accumulations of matter isn't very different than the SO accumulations, in principle; in the space between the SO accumulations of matter the SOs are merely ordered differently and they have different densities, motions and structures than the SOs inside the SO accumulations.

3.2 $\frac{1}{r^2}$ Distance dependence

The 1/r2 distance dependence of the effect strength of e.g. gravitation, or of the electric and magnetic interaction results most simply, if one assumes that the SO accumulations emit their SOs evenly in all directions (spherically). [20] In this way the density of the SOs decreases automatically with 1/r2, if their speed remains constant. One can imagine that the number of SOs, which must be emitted e.g. by an electron to produce a fairly even electric field, must be unbelievably great. For that reason, the number of SOs (and SO accumulations respectively), of which it consists, must be appropriately great (so that sufficiently many interactions arise for such a high emitting density). Since, though, we know meanwhile that SOs can be arbitrarily small, this idea doesn't represent any problem.

Of course, for getting 1/r2 distance dependence the effect of a SO on a SO accumulation must always be the same by the absorption independently of the distance of the SO from its source. The effect is to be a velocity change, of course (additional effects, in addition to the velocity change, are also possible, of course).
Now then, here an interesting thought arises: If the density of the emitted SOs is a measure for the intensity (strength) of an interaction then one can imagine that some kind of saturation density can be reached above which no increase is possible. For gravitation e.g. this would mean that there could be a maximum gravitation strength that cannot be exceeded. The more this maximum effect strength is approached the less the effect strength increases by adding more SO accumulations (elementary constituents) to an entire object. For gravitation e.g. this means that great objects (e.g. planets or suns) contain more mass (therefore elementary particles) than their gravitation strength represents. If e.g. the sun would be subdivided into smaller units (e.g. into little planets) and if these units would be scattered widely then the addition of these individual gravitations would be greater than that one of the sun. So, if a sun explodes then the gravitation of the universe increases.
A similar coherence also arises for the following reason: Matter consists of many single SO accumulations, which interact with each other. These interactions take place by emitting and absorbing SOs. So it is obvious that some of the emitted SOs are already absorbed inside a material object by the SO accumulations being there. Therefore these SOs, which are absorbed inside the material object, don't leave the material object at all and so they don't contribute to the interaction between material objects. When considering more exactly it becomes perspicuous that matter includes very much space between the substantial SO accumulations; therefore the absorptions inside are low. On the other hand, at greater objects, such as the sun (or black holes), these inner absorptions can really matter - and weaken the entire effect considerably.

3.3 Absorption dependent emitting density

In the next chapter the electric effect will be described, but before that it still must be mentioned that not all interactions have to meet necessarily the 1/r2 distance dependence at all. A simple example to this arises, if the number of SOs, which are emitted by a SO accumulation, *depends* on the number of SOs, which are absorbed by this SO accumulation. Such a coherence is conceivable easily since every absorption can have an influence on the inner equilibrium of a SO accumulation. If, now, two such SO accumulations interact with each other then the number of SOs, which they emit, will increase exponentially due to their mutual influence. The time depended increase of the emitting rate depends here directly on the distance between the two SO accumulations. If here the strength effect depends on the absorption rate then the distance dependence for this strength effect is considerably greater than only 1/r2. Perhaps there are such coherences for forces inside nuclei as the strong and weak interaction.
Here, the forces can become very fast very great in principle, but it is conceivable also well, though, that SO accumulations also have something like a maximum emission rate, which cannot be exceeded. If the emission rate becomes too great then this may destroy the inner equilibrium under circumstances and perhaps the SO accumulation dissolves. The SO accumulations don't have to be understood as stiff, eternal formations anyway. They form in one place, dissolve again, and form in another place newly - provided that there are enough suitable SOs. Inside matter (or atoms), where many SO accumulations (and SOs) are, this probably happens permanently. From this e.g. the stay probabilities (probability of finding) of electrons inside atoms arise.

3.4 The electric effect

The electric effect is caused by electric charges, which produce an electric field. The electric field arises by the electric charges emitting great numbers of SOs in all directions evenly (spherically). The very special about electric charges is that there are two different types. Different charge types attract each other; same charge types repel each other. This suggests that the SOs, which are emitted by the different

types of electric charges, are also different. The very special is here that not only charges of the same type interact with each other, but also charges of different types interact with each other, and they do that with the same strength - so they aren't only different but they are also equal. The equality is here that, that both charge types can also interact with the SOs of the respectively other type.
So the question is: Of what nature (conditions) are the different charge types and the SOs, which they emit, so that the mutual effect takes place?
There are for certain several possibilities for explaining these findings. I would like to outline here a basic (almost simple, but effective) possibility briefly: One simply assumes that the SOs, of which the SO accumulations of the two charge types consist of, have different Rs values. So, one can assume e.g. that the SO accumulations of the positive charges are compressed compared with those of the negative charges. This is represented symbolically at Figure 7 at which p+ are the positive charges and e- the negative charges. (The size relations were chosen here in that way, because the protons are compressed into the small cores of the atoms while the electrons form the large atomic shells.) The interaction is carried out now via SOs whose Rs value lies exactly between those of the positive and negative charges. So, if a negative charge wants to emit one of its SOs then this SO must be compressed first (in Figure 7 this emitted SO is labelled E-). On the other hand the SOs emitted by the positive charges have to be stretched (in Figure 7 this is E+).
Here, now, there are two basic findings: If a SO is compressed (its Rs value decreases) by an overlapping then its speed is reduced in the direction from which the overlapping comes (and increases in the opposite direction respectively), and on the other hand the speed increases at a stretching in the direction from which the overlapping comes (and is reduced in the opposite direction respectively). So, if a SO accumulation (e.g. e-) is partly compressed by the absorption of a SO (e.g. E-) then it is moved resultantly in the direction in which the absorbed SO has been moving. This corresponds to repulsion. If, on the other hand, the absorbed SO causes a (partial) stretching then the SO accumulation is moved in the direction from which the SO has come. This corresponds to attraction. Transferred to our case this means (see Figure 7): E- is compressed compared with e- and causes a compression at the absorption. So the e- repel each other via the E-. E- is stretched compared with p+ and causes a stretching at the absorption (by p+). So the e- and the p+ attract each other via the E-. E+ is stretched compared with p+. If, now, E+ would cause a stretching at the absorption by a p+ then this would mean that the p+ attract each other via the E+, what, however, cannot be the case. Here, the history of emergence of the E+ and E- is substantially. The E+ and E- have the same Rs value. However, E+ had to be stretched to reach its Rs value (since it arises from the p+) and E- had to be compressed (since it arises from the e-). This stretching and compressing corresponds to opposite tension states respectively. So, if an E+ is absorbed by a p+ then it has exactly the opposite effect than an E- (although both have the same Rs value). This means, that the E+ actually cause repulsion to the p+ and attraction to the e-, exactly as it corresponds to electric charges.

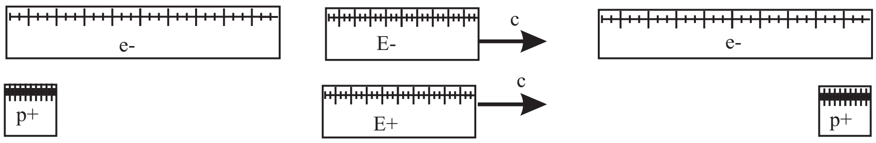

Figure 7 The electric interaction

This can be formulated (expressed) also differently: E+ arises by stretching at the emission. At the absorption by p+ a retransformation of E+ takes place; and at this retransformation the momentum, which was put into E+ at the emission by stretching, becomes free (gets out) again. The freed momentum results in repulsion. (The emitting charges, for their part, are in equilibrium in all directions.) e- is stretched compared with E+. So, if E+ is absorbed by e-, no retransformation of E+ takes place; not at all. It is not only that E+ does not free any momentum; it even absorbs some momentum at its additional stretching at the absorption. This momentum is lacked by e- at this place (on the side of the absorption), and this lack of momentum corresponds here to an attraction.
For E- it is analogous: The stretching at the absorption by e- corresponds to a retransformation, the compression produced at the absorption by p+ absorbs momentum.

At the analysis of matter one notices that it finally consists only of electric charges, if one assumes that neutrons also consist of electric charges, half positive and half negative. So, the electric interaction seems to be the most important of all interactions at this order of magnitude. Of course, there can be still numerous of other interaction types, in principle, with their own SOs and their own effect mechanisms. However, it is astonishing, though, that it is actually possible to explain both the magnetic effect and the gravitation by the SOs of the electric effect. This I describe now in the next chapter. There, of course, it is then all about the question, how do the SOs and the electric charges change, if the electric charges are moving.

3.5 The magnetic effect and the gravitation

If an electric charge is moving then the field, which it produces, increases its distance from the charge in the direction, in which the charge is moving, more slowly than from a resting charge and in the opposite direction faster. It almost looks as if the field is compressed in motion direction. One could assume now most simply that this compression and stretching has no influence on the density (frequency) and type (size, Rs value etc.) of the SOs of the electric field. In this way the effect of the electric field would remain unchanged. This is justified by the fact that the motions of the interactions (e.g. oscillations) of the SOs inside the charge, which produces the emitted SOs, also get asymmetrical due to the motion of the charge. On the other hand we know, of course, that the motion of an electric charge produces a magnetic field. Actually, it turns out that the magnetic field is explained by *changes* of the SOs of the electric field.
So we proceed on the assumption that the electric field is actually deformed by the motion of the charges (compressed in motion direction and stretched in the contrary direction). This means that the length of the SOs and the density of the SOs changes. But, in the direction of the motion of the charges there isn't any magnetic field, though, so in this direction the electric effect is not to change. This is how that works: Let us look e.g. at the compression in motion direction. The density of the SOs increases but their length decreases at the same time, too. A shorter SO is absorbed faster by the absorbing charge, the absorption time for its part is substantially for the size of the OA and for the size of the interacting area respectively, and the size of the interacting area is substantially for the effect strength. One can grasp this most easily by imagining that an absorbed SO only interacts with an area, which corresponds to its size, and that only this area develops an effect - which corresponds to its size. So the change of the density is compensated exactly by the change of the length so that the electric effect remains unchanged in the straight of the motion of the charge. Here, in principle, one always can define an arbitrarily big (or small) area of an electric field being one single element, and one will notice that compressing or stretching this element by a velocity (of the charge) in the direction of this velocity doesn't cause any change of the effect strength of the electric field on other charges.
If the contexts of the previous chapter shall be valid, then the Rs values of the charges and those of the fields (so, that of e-, p+, E- and E+) are not to be changed by the motions of the charges. Since the e-, p+, E- and E+ are complex structures, their Rs values are *resulting* (average) values and one can imagine easily that these average values remain constant, similarly as the light speed. So, in the end, the intensity (strength) of the effect depends on the number of absorbed SOs. From this the additivity of the effect of the electric charges also results. Here, it has to be taken into account that, on the one hand, the number of SOs, which build an electric field, is enormously great, but, on the other hand, these SOs can be also very small simultaneously. So, looked closely, there is very much space between the single SOs.
Of course, the absorbing charges also can move. Due to their motion, the number of the SOs, which are absorbed by them, changes. This nevertheless may not change the effect in the straight of the motion. Therefore, the lengths inside the absorbing charges are also changed in a corresponding way. I describe these connections in detail in my paper: “Magnetism And Gravitation As A Result Of Geometric Changes In The Electric Field Caused By The Translation Of The Charges”, which can also be found on my web side (www.hochecker.eu). There I then also describe, how the magnetic effect and the gravitation arise from the electric effect.

Represented in strongly simplified terms, it is all about the following: Caused by the motion of an electric charge the SOs, which are emitted by it, change geometrically - they get an angle perpendicular to the motion of the electric charge. This is primarily due to the constancy of light speed. The effect strength of such an electric SO also depends on the time (duration), which is necessary for its absorption. Because of the speed depended angle this absorption time changes, and to be more precise, it charges *only*, if the absorbing charge is moving. The change of the absorption time changes the electric effect exactly in the way as it corresponds to the magnetic effect. Here, it has to be taken into account, though, that the absorbing charge also changes geometrically in a relativistic way, which also influences the absorption time. One of the difficulties was *to show* that these speed depended angles get effective really only, if the absorbing electric charge is moving. For the changes, which arise by changing the reference systems, the SRT has to be consulted furthermore.

It can be shown subsequently that it is also to explain the gravitation by changes of the absorption times of the electric SOs. The gravitation also arises only, if the absorbing electric charges are moving. So, the gravitation is also a side-effect, which arises by the motion of electric charges.

Formulated briefly: I show why an electrically neutral field doesn't effect electrically neutral, when the charges are moving.

Even if the magnetic effect and the gravitation can be explained by the SOs of the electric effect this doesn't mean, of course, that magnetism and gravitation cannot also have their own SOs via which they interact. The corresponding effects then don't exclude each other, but they take place simultaneously.

3.6 Electromagnetic waves and SRT

With respect to the electromagnetic waves there are three interesting aspects: the constancy of light speed, the magnitude of light speed, and the wave-particle duality.

Considering the constancy of light speed it has to be discovered, why that must be valid, and why it remains valid despite velocity changes (that is at accelerations).

At first its cause: The light speed is that speed with which the interactions of matter, which are based electrically, take place. Its constancy regarding the observation (reference) system is probably very essential for developing stable conditions in matter. If this interaction speed weren't constant, then e.g. the interaction mechanisms inside a moving atom would be well different from these inside a resting atom, and if, now, the resting atom should get into direct interaction with the moving atom then there wouldn't be any matching base for that. So, atoms would come in completely different interactions, depending on their (relative) speeds (velocities). An additional example is the oscillation of a positive with a negative electric charge. So that the right type of oscillation arises the electric field must move with the same speed (that is light speed) in both cases: at "the move toward each other" and at "the remove from each other" (what wouldn't be that way, if light speed were dependent on the speed of the source). Since, of course, the same *must* be valid also from the view of an observer who is resting in one of the charges (the electric field has light speed), the inevitable result from this is that light speed is constant for all observers and has the same magnitude!

How is it, now, about the constancy of light speed at velocity changes (accelerations)? For this, one can imagine two trains, which move with the same speed behind each other. A measuring tape is fastened between them. Now both trains are accelerating *simultaneously* in *exactly* the same way (e.g. both get faster). If they get faster in exactly the same way, they must be compressed also in exactly the same way (according to the SRT). The result of that compression is automatically that the distance between the trains gets longer. On the other hand, the measuring tape between them, which is accelerated in the same way, gets shorter, of course. Consequently, the measuring tape is too short now to connect the two trains. If the measuring tape represents the space between the two trains, then this means that additional space must be made between the two trains. The observers on the trains also will make this observation. The same problem also arises for every single train, in principle. If one imagines that all parts of the train accelerate simultaneously then the distances between that parts cannot change, on the other hand, the Rs value must change and cause compression, however. This is only possible, if the train gets longer from the view of the observers inside the train, otherwise the constancy of light speed wouldn't be valid any more. So, a simultaneous acceleration produces additional space. This also happens, in principle, if the acceleration processes are different (but e.g. nevertheless the same final speeds are reached), but then the quantity of the additional space is different, too. Where does this additional space come from, however? Well, at pure, single SOs it is simply the result of overlappings. In the macroscopic, material world the space between the material objects is filled with moving SOs, which are, among others, emitted and absorbed by the material objects. These SOs between the material objects finally define the size (length) of the space between the material objects for the observers. On the other hand, the number of the SOs (and their size and Rs values), which are between the material objects, result by the motion and the motion changes of these material objects, what means that the space between these objects also can change correspondingly for an observer. In this way the conditions of the SRT can be satisfied in our complex, macroscopic world. This also is valid for the constancy of light speed.

The next question is now: From what does the magnitude of light speed arises? (Therefore: Why does it have exactly this value?) To answer this question, it must be cleared before, what electromagnetic waves actually are. Electromagnetic waves are made, when electric charges oscillate. These oscillation motions of the electric charges are then reflected in the distribution of the SOs, which are emitted from them. The electric share results by the density of the electrically positive and negative SOs, which are grouped oscillation like, and the magnetic share arises from the extent of the geometric deformation of this SOs (the angle change, mentioned in the previous chapter, is meant). So, electromagnetic waves aren't much more than electric SOs grouped oscillation like (which, of course, move with light speed). These SOs of the electromagnetic waves move through the space, which is between matter. This space, though, between matter (the so-called vacuum) is filled with various SOs of all sorts. While the SOs of matter, however, are packed much more dense and structured highly and are in permanent (ordered) interaction, the SOs of the space between matter are much less structured and more unordered. Despite this lower SO density of space, though, the SOs of the electromagnetic waves cannot move completely unhinderedly through this tangle. Overlappings take place permanently from all possible directions, which hinder the translation of the SOs of the electromagnetic waves. So, the speed of the SOs of the electromagnetic waves depends, among others, on the density of the SOs, which fill the vacuum. This SO density of the vacuum is approximately constant in many areas from which the various observations can be explained regarding light speed. On the other hand, changes of the SO density of the vacuum also can result in changes of light speed, which, e.g., then can be manifested in red shift of spectral lines (the interstellar space would therefore have an a little different SO density (distribution) than the heliosphere). The constancy of light speed (regarding the observation system) also corresponds to this interpretation. Because, if the vacuum is filled with a great bandwidth of all sorts of SOs then the speed change (or the change of the observation location) of an observer will hardly be able to change the size, form and Rs, Rt and Rts values of this SOs *on average* (particularly since it has turned out in part 2 that these things don't behave linearly anyway).

The SO density of vacuum also explains interference and diffraction of electromagnetic waves. Although the SOs of an electromagnetic wave are emitted from the electric charges one by one and although they move independently in principle, they still are connected with each other, all of them, by the SOs of the vacuum. The everywhere and always present SOs of the vacuum (which move permanently in all directions) are for the SOs of the electromagnetic waves the equivalent of water for water-waves. In differenze, though, to water there cannot be any absolute motion relatively to the SOs of the vacuum on average since the SOs of the vacuum are always the same for all observers, on average. At the diffraction it also is, that the matter of the edge of a slit can have influence on the SO density and distribution of the vacuum.

An electromagnetic wave is therefore a group of SOs ordered wave-likely. The shorter the wavelength is, the more densely packed and spatially restricted these SOs are. Finally photons are made. In difference, though, to the objects with (inert) mass (e.g. electrons) the SOs of the photons do not interact directly with each other (since they all move with the same speed, light speed), but only indirect via the SOs of the vacuum. The SOs e.g. of an electron, however, do interact directly with each other (from what e.g. the emission of the electric field arises, as already mentioned). So, objects with and without (inert) mass differ, among others, in the way in which the SOs, of which they consist, interact with each other. So, photons don't have inert mass and they also don't emit any (own) field. Electrons, on the other hand, do have inert mass. Nevertheless, electrons also consist of SOs, of course. And, of course, these SOs of the electrons also do interact with the SOs of the vacuum. Therefore, it is seems natural that electrons also have interference and diffraction. For this, though, the SOs of the electrons should also be ordered wave-likely. And, in fact, it was described at part 1 that oscillations of SOs are an essential feature for the cohesion of the SOs of the highly structured SO accumulations of matter. So, the frequency of an elementary particle (e.g. electron, neutron, proton) provides information about the oscillation characteristics of the SOs of which it consists. So, the wave-particle-duality arises from the fact that both waves and particles consist of SOs, which all do interact (somehow) with the SOs of the vacuum. [21]

3.7 Inner equilibrium of SO accumulations

Inside the highly structured SO accumulations numerous interactions take place (e.g. oscillations). One can imagine easily that the conditions there will not remain stable durably. There can be independent inner developments, which can disturb the inner equilibrium (e.g. an oscillation, which gets into resonance in insignificantly wrong place, at wrong time). Such disturbances, caused by independent inner developments, also can lead to the destruction of the SO accumulations, in principle, and since the inner developments aren't visible from outside, it seems as a spontaneous, independent destruction of the SO accumulation. This could correspond to the spontaneous conversion of elementary particles in electromagnetic waves. Here, it has to be taken into account that these inner developments must not proceed linearly at all so that also sudden, fast developments are possible, compared with the life time of a SO accumulation.

Here, it is particularly interesting that these inner developments can cause also spontaneous, from outside uninfluenced *velocity changes* of the SO accumulations. From this then momentum and energy arise from space and time.

A velocity change is acceleration. This means that an inner development, which produces a durable acceleration, is conceivable. If the direction of such a durable inner acceleration would be contrary to gravitation, then that would be anti-gravitation. For a technical realization the following is interesting: When a normal, material object is accelerated, then it deforms, as a rule. In an analogous way an object, which is resting in a gravitational field, also is deformed (such as a balloon, which is lying on the ground and is filled with water). If, now, the inner development of a SO accumulation results in acceleration, then one can imagine that this inner development is also accompanied by a deformation of the SO accumulation. Transferring this thought to a macroscopic, material object this means that it is perhaps possible to get this object to deform itself (from inside) in that way that it accelerates contrary to gravitation. Of course, here, the deformation shall *not* arise from the contact to the ground. Perhaps the goal can be achieved with a suitable electromagnetic field, and perhaps it also costs energy - but, after all, one would have anti-gravitation.

At the end of this work the following shall still be mentioned: It would be interesting for certain to gain momentum and energy from space and time practically. To this, the followings: The inner development of a SO accumulation can cause, in principle, that a SO accumulation can have several equilibrium states between which it can change (switch). The shift from one of the equilibrium states into another can be accompanied by velocity changes. At this state-shifts momentum and energy are changed in space and time mutually. This can be measured, when e.g. an electrically loaded particle, which e.g. has two such equilibrium states, is send through electric and magnetic fields (as at the mass determination). Because, when such a particle shifts between its equilibrium states while it is inside the field, then that causes a speed change (which changes its residence time inside the field), which is reflected in a deviation of the value of the distraction. Measurements with different electric charges, different speeds and different distracting fields should show such deviations (which may be small). Especially strong but very short (distracting) fields should be suitable here.

An additional possibility of measuring momentum and energy from space and time arises (perhaps), if at the shift between the inner equilibrium states not only the speed of the particle changes but also its mass. Here, it is possible that the changes of the speed and the mass are coordinated with each other in that way that the momentum of the particle doesn't change - which actually mean that we have conservation of momentum. If, though, this particle moves to and fro inside a hollow body colliding elastically, and if it is on its way in one direction in another equilibrium state than on its way back, then the conservation of momentum may be valid at every single instant, but on temporal average the addition of all single momenta (of the hollow body and the particle) *changes*. So, the momentum of the system as a whole changes because of the state changes of the particle at its to and fro motion. We see here that the momentum of a system can change although its single momenta remain unchanged.
This can be proved perhaps experimentally. On one side (at Figure 8 this is room B) inside a hollow body, which is uninfluenced from outside, a source for fast particles (e.g. hot gas or α-, β- or γ-radiate) is placed, but that particles cannot leave the hollow body, on the other side (room A) there is a substance, which is permeable partly for fast particles, as e.g. a gas of (heavy) atoms or molecules. There is the hope now that some kind of imbalance disturbs the heavy particles, when the fast and the slow particles collide, since the exchange of momentum is primarily taking place at the side of the heavy particles; this disturbing imbalance, now, could be very similar to the state changes of the to and fro moving particle, described above. Perhaps the state changes of the fast particles also are effective - in any case the entire system of heavy atoms, radiation source and hollow body could receive momentum from space and time in this way, therefore that is momentum completely without recoil. It had to be checked experimentally which fast particles (radiate) must collide in which angles with which atoms or atom groups to finally receive this momentum from space and time.

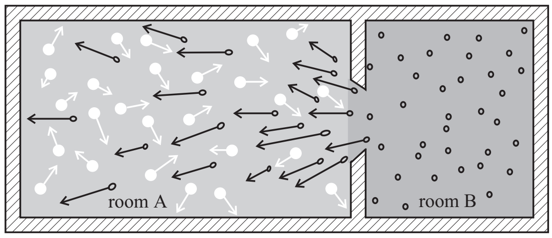

Figure 8 Experiment "roket"

Short closing remark

In this work I have introduced the concept of the SOs. I have shown what SOs are, why their definition makes sense, and how they can be used. With numerous examples the strength of the concept got clear, and it got clear how far-reaching it is. It has to be particularly highlighted here that it got possible to explain all field like interactions between matter (such as electricity, magnetism, gravitation, strong and weak nuclear forces) with the help of the SOs in a general way. Connected with that a more general representation about the nature of matter as such is developed also. The next steps are now to work out the concept further, and to prepare experimental proofs.

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