Gravitational Doppler and Level Relativity solved a discovered momentum paradox and identified the cause of relativity

V.Schatz

We discovered how an inertial frame can be identified to be preferred over the other of being higher relativistic with respective to time dilation. Gravitons were identified as underlying a postulated Gravitational Doppler effect. It was found that a gravitational field of Gravitons is dynamically Doppler shifted. This enabled a generalization to identify static and dynamic gravitational fields to be equally responsible for all relativistic effects and therefore to be added by Gravitons in a proposed Gravitational Level model, a G-level, where every Inertial Frame does have its own summarized Gravitation Level and all relativistic effects are described by comparing them in the height of this level. This explains why it was true in Special Relativity the "moved clocks are slower" as a moved inertial frame has always a higher G-level by additionally Doppler shifting the resting one. A new discovered Momentum Paradox of Special Relativity, which contradicts irreparably the symmetric mass transformation, explained vividly in a be thought cosmic billiard game, was discovered and solved under Gravitational Level Model and a method to calculate the relativistic momentum using Lorentz transformations correctly only in a relativistically limited asymmetric way was introduced. Models of gravitative nature of the acceleration of solar wind particles and of the hot suns corona could be based on present hypothesis and an experiment was introduced to prove it. The dispute is guided in a vividly manner under using relativistic classic thought experiments and can be understood by anyone with an interest in relativistic physic science.

Gravitational Doppler Effect Hypothesis

As the physical cause of the dynamic or *speed relativity,* to which the special reactivity theory, SRT, must count , a *gravitational Doppler effect, G-Doppler,* on the photon-like, massless, light-fast *gravitational force transmitter particles Graviton is used* as a hypothesis in the Space posed and explored.

By the relative movement of an inertial frame, IF, the Gravitons which are moving with the speed of light in all directions from all masses of the universe are *locally* gravitationally Doppler shifted in the location of each particle thereby causing locally a respective stronger gravitational field. As a result, all distant masses instantly have a locally "heavier" effect, although nothing happens to them retrospectively and at their locations. The graviton is photon alike after its emission decoupled from source. In a faster inertial frame the universe is proportionally relativistically „heavier".

This acts like a static summed G-field in the vicinity of cosmic central mass objects and therefore causes the same relativistic effects. So there is only one common, always only *gravitational cause* of all relativistic effects. Gravitation is the causal medium that takes care of the relativistic phenomena.

The gravitational force mediator particle, a graviton from the SM, the standard model of particles, must have a similar nature to photons, but also a difference from them. Both are massless and light fast. The difference in spin is of no interest in terms of quality. The speed of light causes them both the space itself or something else in it. This is considered a given basic phenomenon in the present new theory and is therefore not explained.

Similar as the “virtual photons” of the electromagnetic force, this medium cannot be directly determined as a force mediator. The gravity cannot be shielded and goes through everything. Like photons, gravitons must be superpositionable, i.e. they do not influence each other. They do not take up any space like the mass particles do. Their effect must add up. The gravitational forces are their interactions with the matter particles. Therefore, no Michelson experiment can determine it. A not found cannot provide evidence of the non-existence of what the seeker cannot even suspect and think. That medium is the Gravity.

The various local summed up gravitational *G-field levels* determine where the relativity has a stronger or weaker, relativistic effect in relation to another gravitational-inertial frame or system, GIS. Because an object moved in relation to the earth is in the same earthly G-level close to the earth and due to its relative movement something is always gravitationally added by dynamic gravitational Doppler shift, G-Doppler shift, it is clear that it is more *relativistic than that earthly* matter exists. His time is therefore dilated slower.

The interacting entity of our hypothetical theory is the graviton as a light-fast massless particle similar to the photon and virtual photon. This gives it a localization in space.

On the other hand, the spatial structure according to the General Relativity Theory, the GTR, is less suitable for gravitational Doppler shift. Although it is also conceivable to subject the curvatures of space to a stretching or compressing in the direction of movement and this can also be further deepened as a school of thought. However, we stay with the gravitons as entities capable of Doppler shift.

The two postulates of Einstein also cover this new theory, in particular the constancy of the speed of light and the validity of the physical laws in all inertial frames.

To be fit for this lecture it is enough to be common with standard works on relativity and optical Doppler [1].

Blue and Red Shift and Transverse Gravitational Doppler Effect

We also take over the transversal and movement-direction-dependent blue or red gravitational Doppler shift from the optical Doppler effect. As a result, the gravitational fields from gravitons in the back are Doppler shifted in red, and those in the front are Doppler shifted in blue. They are Doppler shifted transversally in red. As a result, it must produce cosmic effects, which can be traced back to the fact that it produces a forward force. This must be imperceptible or very low at classic slow speeds. And only from a sufficiently high force would it have to ignite gravitational-Doppler-relativistic and show acceleration.

Discovered and solved a Momentum Paradox of SRT

The new gravitational-Doppler-relativity theory now solves a number of known and unknown paradoxes very intelligently and consistently in the present qualitative model.

Twin paradox and a second triplet paradox resolved

All previous qualitative model explanations have never provided a valid reason for preferring the selection of the "moving inertial frame". The acceleration could be mentally eliminated. It is stated that a change of the inertial frames took place - but that also fails, because from the inertial frame of the moving, the earth changes its inertial frame twice.

Now it is clear why the acceleration was at least right to explain. All moving inertial frames had the G-level, gravitational level, of the earth and in addition received a G-Doppler shift of this earthly static G-field through a relative dynamic movement. As a result, they are at a higher summarized G-level and experience more relativistic effects. The G-Levels are different relativistic.

The same is true for the first triplet paradox by Doppler shift the twin paradox. A second triplet paradox has been discovered, which takes place between the two anti-parallel travellers with an increased Lorentz factor γ . Both are at the same G-Level and therefore have the same relativistic time dilation and other effects.

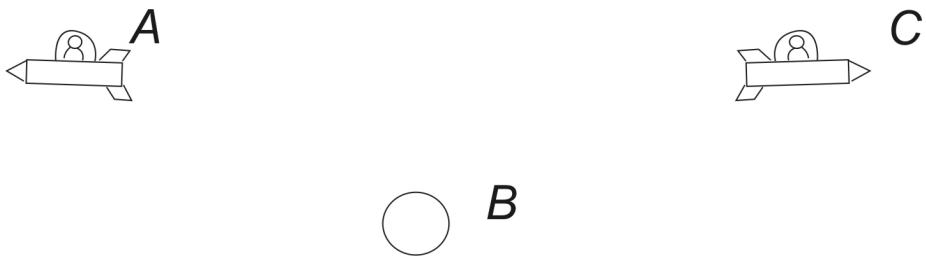


Fig. 1. Triplets space travellers A and C on an antisymmetric journey with respect to Earth B.

Figure 1 shows two symmetrically antiparallel travellers A and C with respect to Earth B. In the SRT literature it is known as a triplet paradox merely as a double case of the twin paradox.

The question that we are presumably asking for the first time was never asked - what is the relativistic effect between the two astronauts *who travelled anti-parallel* ? Between them the speed difference is relativistically added "twice" than in each case in relation to the earth. This speed sum must be calculated according to relativistic speed addition and results in a number that must always be smaller than speed of light *c*.

We then have two different Lorentz factors, a Gamma_1 in relation to Earth and a larger Gamma_2 between the two anti-symmetrical astronauts A and C travelling anti-symmetrically in space. Because both space travellers carried out completely symmetrical journeys, their on-board time

must have been dilated in the *same way* and they come afterwards, aged *just as* younger as their earth brother on earth.

For both travellers we can say that their Gamma_2 must have caused something unexpected for them on board. Their time dilation in relation to earth was the *same* and therefore the time on board flowed *more slowly*. So there is no time difference between their on-board clocks.

At the same time, however, we can legitimately use Gamma_2 to mutually calculate that the other is relativistically *heavier* with Gamma_2 than one himself. Both find this in relation to the other. According to the SRT, the same applies to length contraction! The other is shortened in length - this teaches us the "barn-pole paradox" of the SRT, which is considered to be resolved, is taught by its *symmetrical* interpretation of the length contraction.

The time dilation, of all things, is asymmetrically out of line between the space travellers and has been suspended!? A "*selective relativity*" only takes place for lengths and masses, but not for time? We discovered a selective relativity, which is not to explain in SRT.

Likewise, the question must be answered, which of the two antiparallel moving spaceships A or C is to be regarded as a "moving inertial frame" in relation to the other? You will probably want to call them both that way in relation to earth - but we are interested in the relation between the two. They just did meet in space.

In Figure 2 we show our new proposed solution based on the introduced gravitational G-Levels. A model in the form of 2 mountains is shown, self-explanatory for the gravitational levels. There is a *gravitational background* with a G-height $h_{farG,}$ which is assumed to be the same for both spaceships A and C, and there are 2 "gravitational field mountains" on it, because A and C are moved antiparallel. Moving parallel they would be on one mountain in this model.

Since their movement is antiparallel and symmetrical in relation to a reference inertial frame B on earth, the gravitational G-Doppler results in an equally high gravitational field with the G-height $h_{triplets}$. With different relative speeds, there would be two different G-heights. There are two *mirrored* G-Levels in which A and C each have the same level and therefore their time dilations are the same, which explains the "selective relativity" discovered above.

In this way, all celestial bodies in space can be mapped on a gravitational level mountain landscape, as in GRT done with the space curvature images, but now also for the relativistically moved bodies.

If we can find a quantitative description of the Gravitons, we would be able to map both the speed-relativistic effects of the SRT and the static-gravitational effects of the GTR in a unified method.

$$\sum G_i = \sum G_{central} + \sum G_{far} + G_{Doppler}(\gamma) \qquad (1)$$

The sum of the central G-fields, the very distant background G-fields and the dynamically gravitationally Doppler shifted G-fields as a function of Lorentz factor results in the entire G-field and the associated G-level. Because of the very distant background G-fields, the G-level is the same

for all local masses and is therefore imperceptibly because it is compensated for in the same way from all directions.

Formula (1) is telling a Doppler field would be just added and it could be calculated so, but it is rather a dynamic factor $\Pi_{Doppler}(\gamma)$ as a function of relative movement used on the sum of the two previous fields as this are same gravitons. The Doppler process itself doesn't add any new gravitons, as the other two fields do fluently with speed of light, but just is Doppler shifting the existing ones red or blue.

$$\sum G_i = \{\sum G_{central} + \sum G_{far}\} \cdot \Pi_{Doppler}(\gamma) \qquad (2)$$

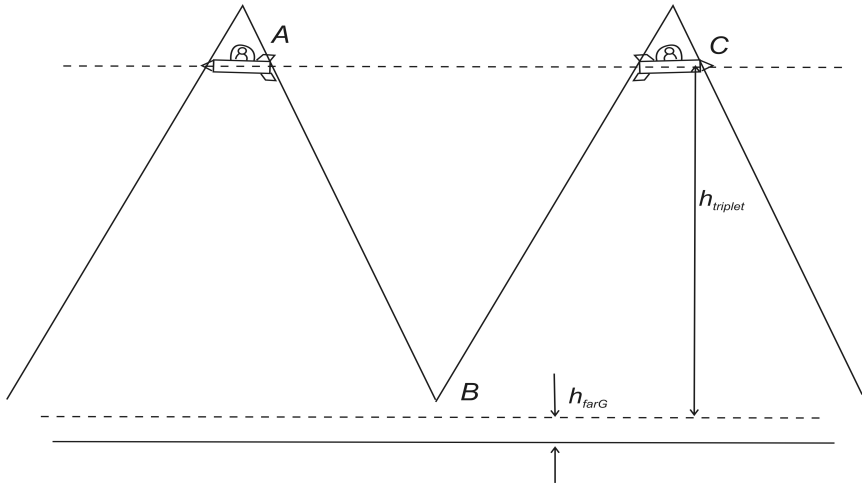


Fig. 2. Gravitation-Level mountain model of the Gravitational Inertial Frames of antiparallel triplet travellers A and C.

To find out which of the two inertial frames is more relativistic, one only has to compare these summed and Doppler shifted G-Levels.

In the example with those travelling anti-parallel, the question is whether they are not crossing G-Levels that are locally different from each other and therefore end up on different G-Levels, even if their movement in relation to the earth is the same anti-parallel.

If a spatial object flies fast moving into a solar system, it dynamically Doppler shifts the static central G-field and rises himself to a higher G-level. The summation of the relativistic effects is also supported by SRT and GTR.

Asymmetric Relativistic Momentum Paradox discovered and solved

From the 2nd triplet paradox above a further question arises as to how the relativistic masses and momentums of the two anti-parallel travellers in SRT can be described?

For this we have come up with a be thought "cosmic game of billiards".

First of all, we start from the classic momentum interactions of colliding balls. If 2 balls of the same mass hit, like billiard balls, one resting and one pushing, then the resting ball receives the entire momentum and the previously moving ball stops. If the impacted ball has a larger mass, its momentum is divided into the previously stationary ball and a residual momentum moves the impact ball further in the same direction. This can be looked up in any standard school physics book $p = mV$.

If the impacting ball has a smaller mass, then it rebounds with a divided momentum and the resting ball receives a partial momentum. With the same momentums from 2 balls, they brag about the same momentums backwards, as if they had exchanged momentums. Let us now look at the whole thing in a relativistic way.

In accelerators such as at CERN, proton bundles are accelerated in opposite directions and collided with one another. The result is an explosive particle image of new short-lived particles accelerated symmetrically in both directions. The energy sum is dependend on the energies of both impact partners. At the moment, the only important thing for us is what the directions of ball movement afterwards are. They are symmetrical, which is also logical, because none of the directions of movement is preferred.

There are also particle accelerators, where fast particles collide against a stationary *target*, for example in the form of a film, and particles knock out of its lattice atoms on the back, which receive momentums. Or, as was discovered by Rutherford, lighter particles of electrons bounce back from heavy nuclei because they bounce off heavy nuclei just like lighter balls bounce off heavier ones.

We set up a mind game in figures 3 to 8 in which a fast spaceship A flies past a slow satellite B near the earth. Both will fly very exactly next to each other at a distance of 5 meters. Both have exposed next to each other an ideally elastic billiard ball of the same mass m, looking them in windows parallel with space ship and resting - which will collide exactly axially. What will these balls experience as momentums after the collision, if one presents different relativistic situations?

The earth satellite observer thinks that the fast ball has received a relatively high dynamic mass, $m' = m\,\gamma$. The Lorentz factor can be thought very large, e.g. $\gamma = 10.000$. That is why he thinks that his ball, which is at rest for him, will be shot away with a very large relativistic momentum and the fast foreign ball will only lose a little of its momentum and will continue to fly after it. The earthly ball receives such a strong momentum that it noticeably overcomes earth's gravity and flies away, even faster than the spaceship and in its direction.

The astronaut in the fast spaceship thinks exactly the same: in his inertial frame he sees in window his own ball at rest, i.e. with the normal rest mass. And the earthly ball including the earth races towards him with $\gamma = 10{,}000$ very highly relativistically heavier.

That is why he thinks that the fast moved earthly ball, which is so relativistically heavier, will sweep his ball away. Then both balls will be moved in the direction opposite to the spaceship along the earths movement after the impact. The lighter spaceship ball receives a rapid gigantic partial momentum and will be moved faster than the relativistically heavy earthly ball *against* the *direction*

of the spaceship's movement with the movement of earth. And the earthly ball receives a very small partial momentum, it tries to remain inertial with the earth and its satellite.

Both results are contradicting each other. The respective "lighter balls" flies in two opposite directions.

We thus have an undecidable decision to make as to what should be true. Intuitively and *ad hoc* we decide that the earthly ball will be shot away and the spaceship ball will continue to fly with the spaceship almost unchanged, only with a slightly reduced momentum. However, just like with the twin paradox with time dilation, this is a completely arbitrary decision that cannot be derived from the SRT and Lorentz transformations without some *ad hoc* effort. But with our new G-Level hypothesis we could.

We discuss therefore more constellations of the balls and inertial frame's.

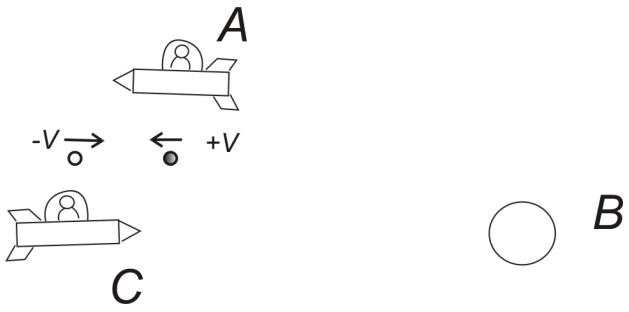


Fig. 3. Elastic joint impact before.

In Figure 3, two space shuttles A and C move symmetrical antiparallel with + V and -V in relation to earth B and they leave a billiard ball of the same mass $m_A = m_C$ next to them with the same ±V, i.e. resting in their own inertial frame's in the space, which they can observe in the window as resting. They move so precisely that the two balls will meet symmetrically in the centre.

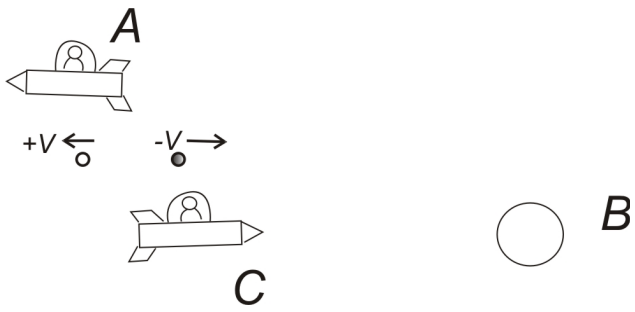


Fig. 4. Elastic joint impact afterwards

In Figure 4 the joint has already been carried out. It was classically slow enough and the momentums were ideally exchanged elastically. Every spaceman therefore sees a ball in the window

that is only offset by one diameter in space and has a different colour. In the relativistic case and ideally assumed elastic properties and infinite strength would be the same figure, since their momentums with respect to the earth are exactly the same. In reality however any material would crumble into pieces, as happens in accelerators when particles collide with particles.

If the two spaceships have a non-relativistic speed difference, then the two billiard balls behave classically. This means that each of the spacemen will see in the window that his or her resting ball is being pushed away and replaced by the foreign ball. Like the billiard balls described above. If you have these balls in different colours, you will recognize it particularly well. This shows the difference to the relativistic case.

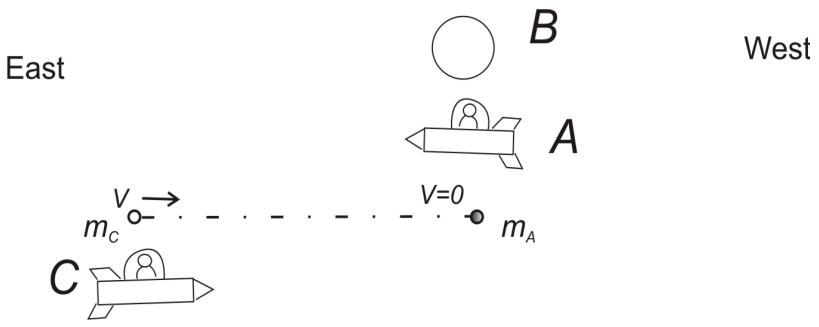


Fig. 5. Relativistic elastic impact in the inertial frame of the earth.

The earthly observer sees a spaceship C approaching with a relativistic high speed V with a Lorentz factor 10.000 and he has prepared a collision experiment A in earths orbit. There will be 2 billiard balls, a stationary one with m_A and a relativistic one with $m_C = m_A \cdot \gamma$, i.e. 10.000 times heavier. He calculates the following impact result and waits to see what will happen.

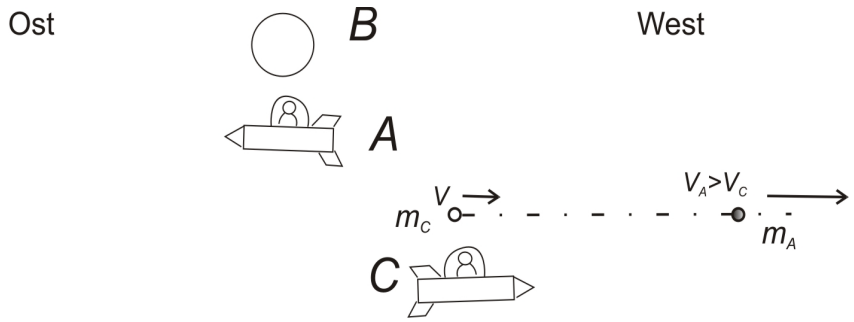


Fig. 6. After the collision from Fig. 5 in the inertial frame of the earth.

We have marked the spatial directions with “East” and “West” and have established that the terrestrial ball m_A hurries away in the direction of “west” at a higher speed than ball m_C. This is an event in space and must therefore be observed invariant in all inertial frame. The direction west in shuttle C direction. The ball m_C, however, receives only a very slight reduction in momentum and also remains moving westwards, it will only move backwards slowly in the viewing window and will eventually disappear out of sight.

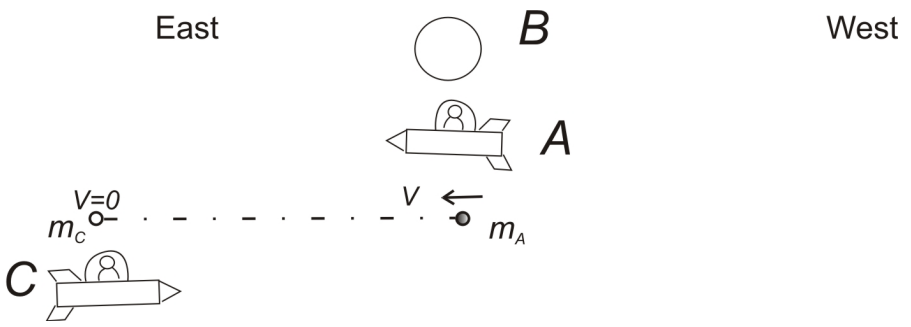


Fig. 7. Relativistic impact in the inertial frame of the spaceship, before.

Now let's think the same thing through from the perspective of spaceman C. In Figure 7 a spaceman in C thinks, that the earth B to the orbit experiment A ball and m_A on it with relativistic velocity V_A race towards and he himself rests with V = 0. We ignore the difference in speed between Earth and the orbit experiment in shuttle A because of its relative insignificance in comparison with speed of light.

Paradox!

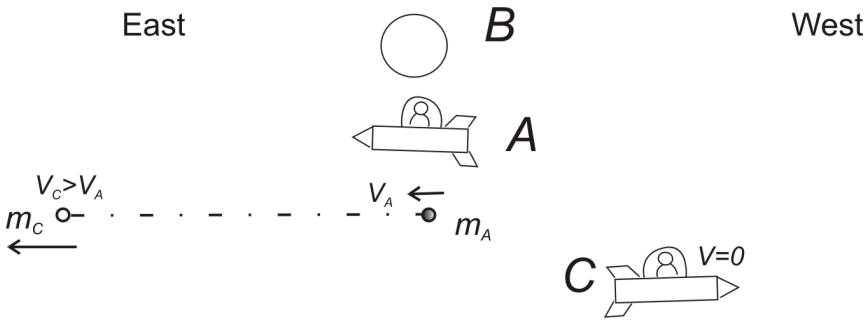


Fig. 8. Relativistic impact from Fig. 7 in the inertial frame of the spaceship, afterwards (gives the wrong contradicting paradox interpretation).

In the next figure 8, the spacemen has theoretically recorded and calculated the impact result in accurate SRT rules, as all inertial frame's are equal in relativistic things.

In his opinion, in accordance with SRT interpretation, his resting and therefore lighter ball m_c with its rest mass will receive a very strong relativistic momentum *p* in the opposite direction from the earthly relativistically moving ball m_A, which is relativistically 10.000 times heavier, and therefore the ball m_c would quickly disappear from his viewing window. His ball m_c and spaceship C fly in *different* directions, he continues to move west and his ball east. This is also an event and must be observed in all inertial frames.

Paradox

So the event in Fig.5 and 6 contradict the event in Fig.7 and 8 producing a paradox

What does the spaceman have to think and how differently to get the right solution? In itself, it is exactly what happens in an accelerator when a relativistically fast particle hits a stationary target - and therefore it has already been *empirically proven*, but it has never been recognized in such a

profane way. But then you have to recognize a *relativistic asymmetry of both inertial frames*, which is according to SRT wrong. With an exception for time dilation only length and mass are handled symmetrically in SRT.

In the SRT this unknown and first discovered paradox is not solvable.

The spaceman has to think according to the *ad hoc* principle that only he and only his ball were relativistically heavier with the Lorentz factor - and the terrestrial ball including the earth must remain unrelativistically "lighter". But he doesn't know why he should think so. And nobody sanctioned him in a canonized book. His mind refuses to think so. Although he knew about protons shooting on a resting targets, he could never have imagined such consequences.

This description in figures above doesn't need any calculation as we can see using a large Lorentz factor in which direction the balls will be pushed.

Another thought game like this: Policeman in bulletproof vest against a bullet

We can offer a similar dramatic thought game: in the present case, instead of 2 billiard balls, a bulletproof vest on a policeman and a pistol ball as an impact partner should be used. In one case, the rapidly moving, relativistically heavy bullet protection vest will hold loosely against a lighter, stationary ball, and in the other, as it is at rest, it will be very easily penetrated by a relativistically heavy, fast ball. The policeman dies or survives - there are again two mutually exclusive events, but with a fatal event difference.

Or a glass plate and a stone would work similar as a glass of a gigantic mass will stand an impact too calculated in one of the IF bit broken in another.

The Problem Solution and Consequences

We did learn, that the calculation of mass and momentum according to Lorentz transformations in the interpretation of SRT is only true, if we choose as a stationary inertial frame the earths as one of the two. Each time if tried to make stationary the “moving clocks, which are dilated” we have got a wrong result for mass and momentum. In SRT this could not be understand as Lorentz Transformations, do not know how to take in calculation the Gravitation Doppler shifting of Gravitation fields of gravitons. And it was not discovered at all until this day.

So we cannot equally use symmetrically in both directions the relativistic mass and momentum between two Ifs as it is the principle of SRT.

But in the one way it is working well and we can now know why. If we use an inertial frame with the lower G-level as a reference then the Lorenz factor is calculating exactly that Gravitational Doppler shifting, which occurs only on the *physically moving inertial frame* and we've got true

results. This was always in all examples only earths inertial frame as reference and it has the lowest G-level. Using that moving inertial frame in opposite direction as a stationary inertial frame it will not occur, because no Doppler shifting occurs on the not moving in the Gravitation field inertial frame and therefore we've got wrong results as described above.

The failure in SRT is that in a space assumed to be empty, the decisive third participant - the gravitational field consisting of gravitational force mediating particles Gravitons - was not taken into account. Do you remember the tiresome subject of aether? The gravitational field is that undiscovered aether of Lorentz and Poincare. The main cause of the relativity was ruled out and consequently never looked for. Even if in GRT the gravity came in front as an geometrical actor, but in a static manner, which didn't allow to adapt a dynamically connection to the SRT.

In the classic twin example according to SRT, it was erroneously assumed that it is completely the same which of the compared inertial frame's is considered to be moving or stationary. This is a big mistake.

This can only be achieved if *actually* and not just mentally this earths inertial frame would be moved together with the earth through the same gravitational field and this is thereby Doppler shifting it. To do this, one have to accelerate and use energy acting by a force to switch to the higher G-level. Only then, through relativistic gravitational Doppler shift, would the earth become more relativistic than a stationary spaceship, which must also be braked in order to switch to the lower earthly previous G-level.

The difference of contradicting SRT and the new G-level Relativity

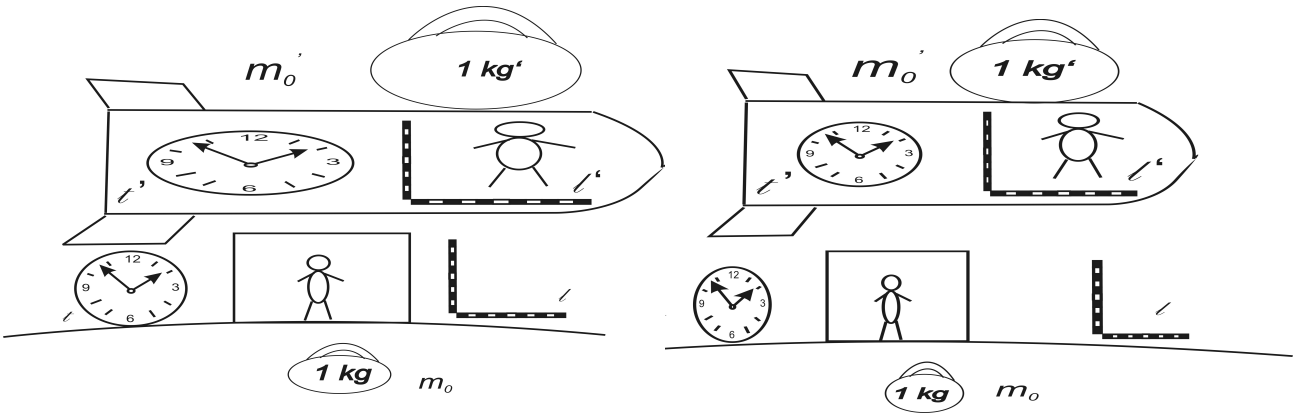
In SRT it is interpreted that mass is relativistically symmetrical between two compared inertial frame: $m' = \gamma\, m$; seen by stationary earths observer and $m = \gamma\, m'$ should be seen by moved observer symmetrically too. Both count the other to be relativistically heavier, which leads to that mass and momentum paradox we described above, causing two different realities, which cannot be solved in SRT principally. But maybe SRT fans will now conclude about the parallel worlds.

In new G-level relativistic it is asymmetrically to: $m' = \gamma\, m$ *contra* $m = m' / \gamma$.

All the known samples in literature about relativistic momentums are made easiest from earths inertial frame and this works in G-level too.

Like the time dilation now is in SRT and GRT able to be transformed asymmetrically we also can do it here with the masses and as consequence with linear momentums.

So the traveller in a high G-level will measure a rest mass of the other inertial frame $m = m'/\gamma$ lowered by Lorentz factor in compare to his *on bord* rest mass m' being heavier then m. This is a revolutionary discover. But the traveller still cannot just count himself in stationary to the earth. He must count his speed moved to this lighter masses of the earth.



a) b)

Fig. 9. A new relativistic situation with G-level a) in earths IF, b) in moved IF.

In GRT the rest mass m_0, is understood be invariant the same in all IF, therefore it was inconsequently not to apply it to calculate a gravitative relativistic mass as an additional part in whole mass. But all constants are invariant due to measurement using relativistically changed units. In SRT mass is symmetrically relativistically changed and that is what was not possible to adopt symmetrically in GRT. Now we can see after uniting the relativistic reason in the gravity, that it must be asymmetrical in SRT and in GRT too.

We also handle rest mass as invariant as all constants, but they are so because of the Lorentz transformations of all units and a measurement using them delivers same numerical numbers. In G-level is to understand, that rest masses are transformed by Lorentz too.

$$m_0 = m_0\gamma; \qquad \text{or in old form } m_0' = m_0\gamma; \tag{3}$$

in backwards direction from a higher to lower G-level reciprocally

$$m_0 = m_0/\gamma; \qquad \text{or in old form } m_0' = m_0/\gamma; \tag{4}$$

For mass the rest masses can be used as mass units, but also a mass unit can be assigned to be more generally handled as an unit Δm and *Δm or in old style Δm' and Δm.*

In Fig. 9 we see that same bar of $1\ \mathrm{kg}$ is showed asymmetrically bigger in space shuttle then in earths IF same 1 kg. We could write 1 kg' and 1 kg, as the units only are relativistically changed and the number as a result of a measurement was left invariant in all constants.

Compare of SRT and G-level Relativity

In Tab.1 is a compare result of two theories in compact form available. We now do have relativistic attributes and 3 are with stretching units. All four are asymmetric between relativistic G-levels. There is a consensus only in time units stretching with the SRT, while all other attributes contradict.

For the length we live by the time being the interpretation of SRT but will investigate this as a question in another work too.

	Asymmetric Level Relativity		SRT, mixed level		
	stationary IF	moved IF'	*stationary IF*	*moved IF'*	
time unit	$\Delta t' = \gamma\Delta t$	$\Delta t = \Delta t'/\gamma$	$\Delta t' = \gamma\Delta t$	$\Delta t = \Delta t'/\gamma$	*consensus*
time measured	$t' = t/\gamma$	$t = \gamma t'$	$t' = t/\gamma$	$t = \gamma t'$	*consensus*
length unit			$\Delta l' = \Delta/l\gamma$	$\Delta l = \Delta l'/\gamma$	
length measured			$l' = l/\gamma$	$l = l'/\gamma$	
mass unit	$\Delta m' = \gamma\Delta m$	$\Delta m = \Delta m'/\gamma$	$\Delta m' = \gamma\Delta m$	$\Delta m = \gamma\Delta m'$	*contradiction*
mass measured	$m' = \gamma m$	$m = m'/\gamma$	$m' = \gamma m$	$m = \gamma m'$	*contradiction*

Tab. 1. Compare of SRT and present asymmetric gravitational level relativity in relativistic attributes by Lorentz transformations.

The triplet of Fig.2 in cosmic billiard

How those triplet travellers can pre-calculate the impact of the 2 balls? First they cannot set each himself to be resting as he would get a wrong result, a none symmetric one. To know about the symmetry they have to find out how the dominant local G-field is moving with its source? The G-field is of gravitons which are as fast as light, but the flow of them as a field is static moved with the central mass. So both will look for nearest star or planet to know that this is the local dominant G-field and they each is moving through it and Doppler shifting it. This movement of that central mass they can use as the lowest G-level and the reference IF.
Then each of them can measure the speed between him and the other traveller and same related to that central mass. Then they can calculate how the relativistic masses are in relation to the reference frame, they get out two Lorentz factors. All further calculation they have to make as the reference frame observer. They get out the speeds and masses of both in reference frame and then they have to make a relativistic momentum calculation. Because it is in reference frame they didn't need to use relativistic speed sum but just uses the speeds in the reference frame and masses too to calculate an impact.

And any third moved IF can only calculate like that. At the moment we know no method how to calculate directly from each IF. And we mean it will stay in principle so.

For example we can think on a fast traveller who wants to observe impacts on LHC in CERN. If he would calculate that for him one of the protons was getting slower then the other he would get completely another result, which would contradict to the pictures of the LHC. So the picture of the LHC would be just changed in length, but the form and symmetry and number and type of particles build in this impact will stay invariant as this are all events.

Equivalency of dynamic and static Gravitation fields

As we now know about the common gravitative reason of relativity we can take results from dynamic relativity to static and vice versa.

In the mass of a star there must be a relativistically additional part, which is not Doppler caused but

just by addition of static fields of all mass particles of it. The relativistic effect is same – this is the hypothesis of present theory.

When two stars unite in one then the new whole mass will be higher then two masses before by relativistic effect as consequence of a higher G-level.

To calculate we must take into account that in centre there is a compensated to zero gravitational field and through the deepness the summarized field is changing. We can use as an approximation the know classical GRT factor similar to Lorentz factor. This factor even doesn't got an own name and we use γ_G.

$$M = \gamma_G M_0 \ , \qquad (5)$$

with M_0 the sum of a rest mass if all mass would be spread in universe far from each other.

Method of the lowest or highest G-level as a gravitational reference frame

We can create a clean method how to use Lorentz Transformation to get surely true results on relativistic masses $m' = \gamma\, m$ and momentum $p' = m'\, v$ to explain consistently a solution of momentum paradox.

1. If two inertial frames are to compare it is to find out which of them does have the lower G-level then the other.
2. All calculations are then to make from that as stationary thought inertial frame with lowest or highest G-level using asymmetrical reciprocal Lorentz transformations as in Tab.1 in same way as time dilation is used. This will exclude failures and let the Lorentz Transformation to serve in right way. The impact result will be same calculated in both inertial frames.
3. Or it can be calculated in any G-level inertial frame, but using the method above, not using own IF as it is a deal between the two impact partners in the gravitational field in which both have each own G-level. After the result is calculated, the movement of impact partners, then it can be transferred into that third G-level inertial frame.

At last two relativistic attributes – time and mass - must be calculated reciprocal by Lorentz factor. This is asymmetric calculation in two attributes. This includes the rest masses too, see our arguments for. In this case the engineer needs to know about the lowest and highest of two G-levels. If that is known, then the Lorentz factor based on the speed difference alone tells us, who of the two is Doppler shifting a higher G-level over the another one - and can decide how to use Lorentz gamma-factor, stretching or contracting in which of IF's.

Point 3 will work in the case of the antiparallel travellers if they know the earth or the like object as a lower G-level reference and it is working in ring colliders by this reason. The earth is always the lower G-level reference in our near space and on earth.

If two objects are meeting in space and they have lost a reference object they should find a new one in space using for example the whole universe fix stars or just the nearest star planet system or a galaxy. So they will understand how their own speed is related to that local Gravitation fields and calculate how they are Doppler shifting them and the other partner in own higher local G-levels. Then they can calculate in the found lowest G-level inertial frame how the cosmic billiard

momentum game will be with that unknown object.

The Lorentz transformation cannot support relativistic transformations from a higher G-level to a lower one, except of time and length. By transforming asymmetrically the mass we would get a lower masses, because we start at a normal mass in own inertial frame being on a higher G-level. So it would be $m' = m/\gamma$ and leads to an invariant result for rest mass constants. This cannot be overwhelmed in SRT as it has a physical back ground explained above.

One can by an additional workmanship think, that if one is on a higher G-Level, then in his own rest masses constants he must think is invisible for him a Lorentz factor, which is visible from a lower G-Level.

This method physicians are using all the time and do not recognise, because all samples are easy and earth is used as reference being with lowest G-level.

We only think on a reference in our IF to calculate how an impact will be. But the particles do exist without our willingly choice of reference frame. And they do nevertheless all impacts very exactly. That must give us to think, that there is an absolute reference frame existing and this can only be the space and the gravity in it. And we should never forget a lesson by Michelson experiment: a none found is no prove for none existence.

In view of present teaching the particles interact with gravitons in same G-field being at different G-levels and so they compare each other with the own *on bord* units of length, mass and time.
Today we have many game software simulating space shuttles and some do use the SRT relativistic effects. If they would program that cosmic billiard game it will show that discovered momentum paradox and if they use here presented theory the result will be consistent in both of IF's.

Gravitational frame of reference

Now a gravitational G-level reference frame in space can be defined. When considering relativistic momentums and masses, one can no longer declare one's own inertial frame to be at rest and ignore how relativistically moved one is compared to other moving inertial frame in the gravitation fields around them both. This is shown by the “cosmic game of billiards” and by the empirically proven particle bombardment experiments of the stationary targets in linear colliders.

Similar to the relation of astronomy to a fixed star background, there is a gravitational background consisting of summed G-fields. The lowest achievable G-Level can serve as the gravitation reference or a G-bottom. There are no upper limits because the energy mass can increase infinitely. The level is like to climb mountains or be in different deepness under water – one can know where is upper and lower direction, but not know how deep the bottom is. So it allows to use a temporary reference frame in a lowest available G-level. It is similar if being in a sky scraper without numbered floors, but numbering them self which are near and accessible ones. A relative reference frame is available in levels.

And that is a difference to SRT where it is told all IF's to be equally even if they use time dilation to be in “moving IF” preferred. In SRT is already a level inertial frame offered but just in time dilation only and not in mass and length which both stay symmetrically Lorentz transformed.

This Level Reference Frame cannot provide a location reference, but only a relativistic G-level reference in compare to another G-level.

Empirical evidence for G-level cinematic is available

The same as to billiard balls applies to a stationary *target* in accelerators that is shot at by fast particles. In doing so, these particles shoot out of the atoms of the *target at rest,* particles that are registered behind the *target*. When viewing the particle from inertial frame, this lighter particle must then bounce back in front of the heavier atoms of the moving *target*, as explained in Figure 8. That would result in two different realities, i.e. contradiction.

Only if you make this *target* relativistically fast physically instead of the particles and let it move towards a particle resting in the earthly inertial frame, the situation will be reversed and momentum results will show it as in Figure 8, because then the resting particles will bounce back from the now much heavier of the moving target. This means that proof of the existing hypothesis and theory is already available - it was just never recognized and correctly interpreted. Of course experimental physicist know that particles will pass through material too and must take in account statistically.

Moving through G-levels and changing between two Gravitational Inertial Frames GIFs due to negative or positive acceleration

Evidently one need same energy and force to change the G-Levels in higher or lower level, doesn't matter. This energy is the difference between the two G-Levels. In case if it is going to a higher G-Level this energy is put into the inner mass energy of the particles according to that G-level. We have to pay energy. Positive acceleration does mean rising up in G-level. It is accelerated in a free fall in a gravitation field of central mass and is same in accelerated rocket.

And if stepping down the G-level this energy will be cut out by breaking with a negative acceleration of the inner mass energy of particles. We win energy which is then too much to be kept in the particles masses in the lower G-level and it is making thermodynamic kinetic movement to the particles when inner mass energy is going to be kinematic energy. So the movement itself does to do with gravitation and the G-levels.

On each G-Level they are own relativistically adopted measurement units for length, time and mass too, which allow to measure all around according to same physical laws as in the postulate of SRT is written.

The accelerations vector, positive or negative is an indicator of rising or descent in G-levels. The twins did it up and after down.

This thoughts about acceleration and kinetic energy and the rest mass energy exchanging in G-levels do bring us to a hypothesis, that it can cause self acceleration effects:

Hypotheses of anti-gravitation acceleration effect on the solar particles

The solar wind particles have an unexplained till today paradox effect of acceleration [4]. Starting with 150 km/sec they are later in earths orbit 500, 750 and 2000 km/sec. The escape speed form suns surface is ca. 615 km/sec so all particles should fall back and could not come so far. All stars in universe do the same. It was tried to explain that by electromagnetic fields but just 1/3 was explainable.

Hypotheses is that after the speed of particle, caused by electromagnetic fields, riches a certain threshold the gravitation would be Doppler shifted and the inhomogeneity in the central gravitation field will be sharper. Then the local G-level is changing fast and the rest mass is getting relativistically lower. The energy difference then is transferred into more kinetic energy of same particle and we've got acceleration.

$$m'_0c^2 = m_0c^2 + \Delta E = m_0c^2 + m_0V^2/2 = m_0c^2\ (1 + V^2/2c^2) \qquad (6)$$

With ΔE the kinetic energy which came out of rest mass m'_0 through changing G-level to a lower one m_0 and did accelerate the lower rest mass m_0 to the speed V. The speed of m'_0 before that process we didn't wrote and it can be thought as kinetic energy to be eliminated on both sides of equation (6).

If the speed was to low before starting it just did produce thermic movements of particles in all directions impacting each other. That why we cannot measure it on our slow rockets and planets.

When later far away the field is going to get homogeneous the acceleration is slower and slower.

This is a model of the potential and kinetic energy of particles in a gravitation field. It is real no anti gravitation charge force but an effect like one.

An experiment of self accelerated particles as a prove

It will be possible to build a prove experiment on that matter. The LHC and the like all are build horizontal and therefore symmetrical in the G-field in one G-level of the central mass earth, so this cannot work.

If we would build an accelerator vertical and shot particles in the height, then if we reach the ignition speed of maybe 150 km/sec. or better more and still it is a very low speed – then we would measure or not measure a positive acceleration of particles as in solar wind. The effect will be weaker as the gravitation field is weaker and it might be a higher ignition speed necessary but it seems to sound a realistic experiment. If it will be not found then it only tells about that particular hypothesis but not of whole Graviton Doppler level relativistic. But if found then we would have a complete physical prove of present model and theory and be sure how this phenomena works.

Falsification possible?

First, this is the only one theory which explains that discovered momentum paradox and the reason for being a preferred inertial frame in “moving clocks”. So when another theory or model would be found, doing that too, then we could maybe see how to differ between the two alternatives. There is no alternative at the moment. Or maybe someone will succeed to explain the moment paradox with SRT or GRT?

Hypothesis of high temperature in plasma of the stars

Another unsolved phenomena of the solar corona is a thermodynamic paradox as we have a cold suns surface of 5500-6000 K and this is in between of 15 billion K in centrum of the star and 1-2

billion K in the corona plasma. How the energy transport can be like “tunnelling” the cold chroma surface? Why there is no equalisation of temperatures?

With that new hypothetical process it can be explained in same principle. But in this particles the acceleration lead to radiation in UV and roentgen spectra and therefore the kinetic energy was taken away and particles could stay in the corona. And this radiation does have a main direction to outside of the star so it doesn't heat back at the surface leaving it cold. The emission of photons did slowed the particles. And some particles didn't stop and they are in the solar wind particles which are accelerated weaker and do not emit photons.

Hypothesis of an inner planetary gravitational heat process

The inner heating process of planets stays also a field of speculative theories. So again it can be the thermic energy transfer of the gravitational level potential energy to kinetic one. Then the source of the heat would be gravitational field in which the earth by rotation is moved between G-levels.

In this case if the planet stands nearer in orbit, by the shape of the orbit and fluctuations to the central mass this gravitational G-level heating process should be also stronger. And the outer side of the planet and inner are in a different central gravitational field by $1/r^2$, so a planet is changing G-Level due to own rotation too. The moon then also is gravitative heating earths masses. The hypothesis is further also that the thermic energy cannot get back into masses and so it pumps the energy out of fields, i.e the space.

And of course same is true for stars which are in back ground gravitational fields moving through and rotating, but the far fields are very homogeneous and effects can be very low.

Hypothesis on very high energy particles

There are very seldom measured high energy particles coming from cosmos in any directions which energy and type couldn't be determined till now. No theory can explain how it could get this high energy as no process in universe is able to accelerate so high. It could be that hypothetical anti gravitative acceleration process which did work on a black hole having very highly inhomogeneous and strong gravitational field.

Inertia of masses

The inner reason of inertia must be thought now in the cinematic of the red and blue Gravitative Doppler shifted G-fields which are acting opposite and having a balance in inertial frame's and having a dis-balance in an inhomogeneous G-field.

This makes a deeper quantitative theory about Gravitons to be expected. In anyway the Gravity is the reason of all relativistic effects and of the inertia too.

Conclusion

We have introduced a new conception of relativity which was never known before, which unifies all relativistic phenomena in one gravitational only interaction. A Gravitational level and a

Gravitational Doppler are two discovered relativistic entities. This is a fundamental deep change in gravitation and relativistic theories. The present stage of the theory is qualitatively one and of a method to use Lorentz transformations another way to avoid paradoxes with relativistic momentum.

For the first time in the history this concept allowed to deicide which IF is more or less relativistic in relation to another IF in same manner as in the GRT by a higher gravitational level. The twin paradox and even the new discovered here 2-d triplet paradox were solved.

We discovered a new much more difficult to solve *paradox of relativistic momentum and mass* which cannot be solved in known relativistic theories SRT and GRT. And we solved this by same concept. If someone don't accept our theory he in any way should explain this new discovered paradox of SRT and GRT.

And we were able to think consistently models of still unexplained phenomena of accelerated solar particles wind and corona temperature. Even an experiment was introduced for testing that self acceleration by gravitation and movement.

We can conclude that after such exceptional success of the present hypothesis about Gravitation Doppler shifting and G-level relativity due to explained phenomena, it can be thought to be a real physical interaction of Doppler shifting between gravitons and particles and so to be sure, that gravitons do exist. Then the graviton is indirectly proved for the first time as no another theory ever makes use of gravitons.

There is an unexpected effort in relativistic physics occurred with unknown deep problems discovered and solved in a way, which gives a new course in future development of relativistic theories. Particles of standard model are involved by gravitons into relativity and a main reason of relativity was identified in gravity only. Relativity is getting more vividly and deeper understandable.

*References *):*

[1] Standard literature on Special Relativity Theory and optical Doppler of any choice.

[2] Wikipedia, Mass in special relativity, available at https://en.wikipedia.org/wiki/Mass_in_special_relativity

[3] Wikipedia, Energy–momentum relation, available at https://en.wikipedia.org/wiki/Energy–momentum_relation

[4] Wikipedia, Solar wind, available at https://en.wikipedia.org/wiki/Solar_wind

**) this references are absolute enough for all teaching presented*