

Foundations of Unified gravito-kinematics theory

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Abstract

Unified gravito-kinematics theory unifies gravity and kinematics on deeper level as current theories. It is generally compatible with equations of General relativity, but it extends it and introduces different explanations to selected underlying principles on which is General relativity based. Unified gravito-kinematics theory explains or solves following open problems: primary cause and underlying mechanism of inertia, explanation of speed of light as speed limit, primary cause and underlying mechanism of relativity (Lorentz transformations), explanation of creation of rings of planets explanation of increasing speed of expansion of universe (dark energy), explanation of galaxy rotation problem, solving of some singularities in relativity theory and solution for compatibility of relativity theory with quantum mechanics, which will open door to merge of quantum mechanics and what is now relativity theory. What is most important, Unified gravito-kinematics theory makes very specific predictions, which can be tested by experiments and by astronomic observations. This paper includes one proposed rotation experiment and explanation of creation of rings around planets and smaller objects.

1. Kineton as cause for inertia, gravity and relativity effects

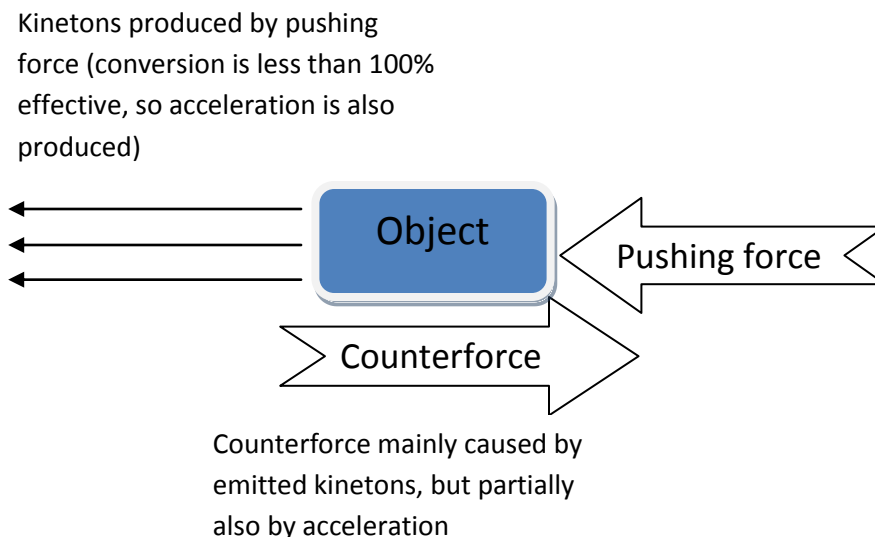
1.1. Unified gravito-kinematics theory (further on UGKT) is based on effects caused by one particle which I have named kineton, to differentiate it from hypothetical graviton particle expected in current mainstream theory as cause of gravity. This new theory is explaining in new approach to underlying mechanism causing gravity, inertia, all fictitious forces and relativity effects like for example time dilatation. All these mentioned physical phenomena have common cause in effects caused by kineton particles.

2. Mechanism causing inertia

2.1. Every force which is causing acceleration of an object with mass is countered by resistance which is described as inertia in classical physics. Main cornerstone of UGKT is the assumption that every force causing acceleration is causing counterforce caused by emitted kinetons. These emitted kinetons are pointing in the same direction as the resulting acceleration of the object and causing counterforce which is based on the Third Newton law: "When one body exerts a force on a second body, the second body simultaneously exerts a force equal in magnitude and opposite in direction on the first body."

2.2. Important point is that this emission of kinetons is caused by the energy to matter transformation of force causing the acceleration. That means, that force pushing the object is converted into kinetons which have the almost the same kinetic energy as energy supplied by the pushing force. This is completely new view on inertia and based on this new view the First Newton law of motion describing inertia can be replaced by Third Newton law. After this unification the inertia is replaced by more logical and more complete view on this process, which is simply a transformation of energy to matter in form of kinetons. But this counterforce based on emitted kinetons has not the same level as the force causing the the acceleration, because if the forces would have be exactly same, it would mean, that the object would not accelerate. The conversion of energy inputted into the object to emit kinetons is not 100% effective, so the counterforce caused by emitted kinetons is smaller and this difference is causing the object to accelerate. I do not know, what is the conversion rate from energy to creation of kinetons, so in further explanation and calculation I will use pure estimation of 99% to 1%, meaning that kinetic energy of created kinetons is 99% and the remaining 1% of kinetic energy is causing acceleration. Further details to this topic will be described in following points.

Picture 1: Example of kinton inertia mechanism



2.3. Describing this new and more detailed explanation of inertia in mathematical equations using kinetic energy, the description of the process is following:

At first, we define, that

E_{k1} is the kinetic energy on the side of pushing force on object with mass m_{ob}

E_{k2} is kinetic energy caused by created kinetons with mass m_{ki} and speed v_{ki} flying out in the direction of pushing force and causing counterforce

E_{k3} is kinetic energy caused by acceleration of the object (more detailed explanation of this part of equation will be in point 7.2).

I assume in the equation that the energy to kinetons conversion rate is 99% to 1%, meaning that E_{k2} is 99% of E_{k1} and E_{k3} is representing 1% of E_{k1} .

$$E_{k2} = E_{k1} \times 0,99$$

$$E_{k3} = E_{k1} \times 0,01$$

$$E_{k1} = E_{k2} + E_{k3}$$

$$E_{k1} = \frac{m_{ki} v_{ki}^2}{2} + 0,01 \times \frac{m_{ob} (at)^2}{2} =$$

What is important to point out, is that the energy to kinetons conversion rate have to be fixed percentage, otherwise discrepancies in $F=ma$ would have been discovered in the past. If the conversion rate is a steady percentage, it works flawless in standard mechanics without causing any hints for additional E_{k2} caused by kinetons.

This description of inertia is very different compared to standard description and from mathematical point of view it leads to more complicated equations as usual standard equations describing classical mechanics also the issue of "mass" m_{ki} of kinton is problematic, but as I will show in following text, this leads to more complete view on several other physical processes.

3. Machs principle and UGKT

3.1. The idea of Machs principle is that local inertial frames are determined by the large scale distribution of matter, as exemplified by this anecdote:

You are standing in a field looking at the stars. Your arms are resting freely at your side, and you see that the distant stars are not moving. Now start spinning. The stars are whirling around you and your arms are pulled away from your body. Why should your arms be pulled away when the stars are whirling? Why should they be dangling freely when the stars don't move?

Mach's principle says that this is not a coincidence—that there is a physical law that relates the motion of the distant stars to the local inertial frame. If you see all the stars whirling around you, Mach suggests that there is some physical law which would make it so you would feel a centrifugal force. There are a number of rival formulations of the principle. It is often stated in vague ways, like "mass out there influences inertia here". A very general statement of Mach's

principle is "Local physical laws are determined by the large-scale structure of the universe."^[1] One of possible formulations of questions arising of Machs principle is following:
If you have a rocket in an theoretical universe which is completely void of stars and any other matter, so that it is completely empty, if this rocket would be rotating, would an astronaut inside feel the centrifugal force inside?

Common current explanation of the Machs principle is that rotation is relative to distant stars or the large structure of matter in the universe. So that means that in empty universe there would be no centrifugal force.

3.2. UGKT offers more detailed explanation of inertia and acceleration. As already mentioned in previous text, pushing force is triggering creation of kinetons and these fly in the direction of the acceleration. That means that all accelerating objects in the whole Universe are producing kinetons all the time. This includes all rotating objects, like rotating planets, stars and rotating black holes. All these objects are producing kinetons and in the end effect kinetons are coming from each direction in extreme large numbers. Also inertia and acceleration are caused by two complementing actions. One part is counterforce caused by emitting kinetons, which acts immediately and is not depending on the "large structure of matter in the universe" but second part is caused by kinetons coming from all direction and which depend on "large structure of *the accelerating* matter in the universe". As already described in previous text, the energy conversion from pushing force to kinetons is not 100% efficient, that means that the counterforce coming from emitted kinetons is smaller than the pushing force. The difference is causing acceleration of object and acceleration is depending on mass of the object. More mass, less acceleration. This is because the kinetons flying from all directions are partially absorbed by the accelerating mass and when are absorbed kinetons from the direction of acceleration, these kinetons have bigger kinetic energy compared to kinetons absorbed from the other side of accelerated mass. This is causing the part of the counterforce coming from acceleration. This is also depending on amount of mass. The more mass, more kinetons are absorbed, bigger difference of kinetic energy caused by absorbed kinetons is achieved and smaller acceleration is gained. This is deeper explanation of the process behind the equation $F=ma$.

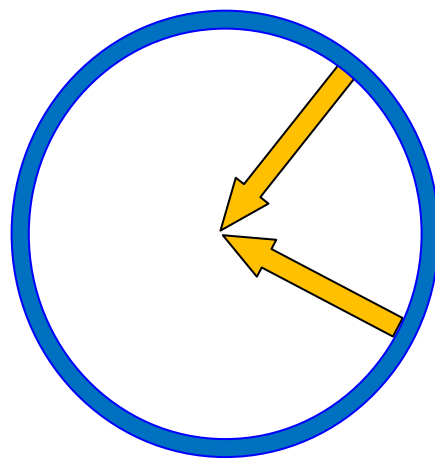
4. Explanation of "fictitious" forces

4.1. Next step in unification is explanation of all existing "fictitious" forces as one single force caused by kinetons emitted as explained in text above. There are four "fictitious" forces: one caused by any relative acceleration of the origin in a straight line (rectilinear acceleration), two involving rotation (centrifugal force and Coriolis force) and a fourth, called the Euler force, caused by a variable rate of rotation. Based on UGKT, all these four forces are single force which is caused by emitted kinetons (inertia) and acceleration. All these "fictitious" forces are only one force which is acting in opposite direction to the acceleration. In next points is detailed explanation of why are these "fictitious" forces only one force. In all cases we have to

take in account the less than 100% energy to kinetons conversion already mentioned in previous points which is causing difference in forces and which is causing acceleration.

- 4.2. Fictitious force caused by straight line acceleration was already explained in point 2.2. and Picture 1 above. Centrifugal force seems to be different than force causing linear acceleration, but it is actually the same force, only the direction of acceleration is different.

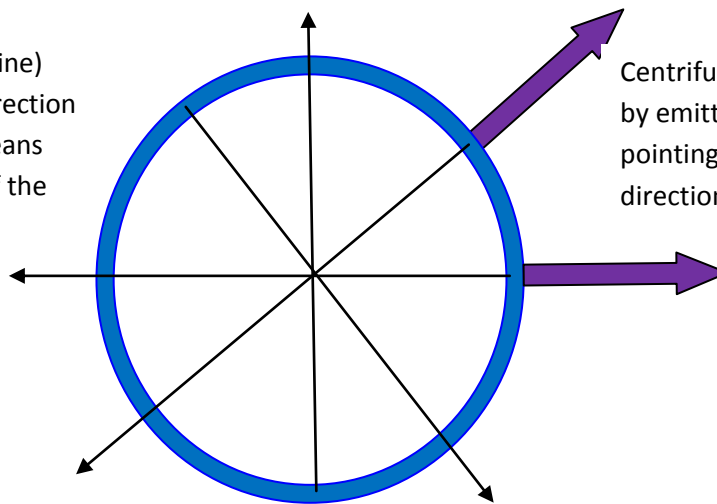
Picture 2: Direction of acceleration for object moving in circle



Object moving in circle with constant speed has acceleration toward the middle of the circle

Picture 2: Object moving in circle emitting kinetons in the same direction as acceleration

Kinetons (black thin line) are emitted in the direction acceleration, that means toward the middle of the circle

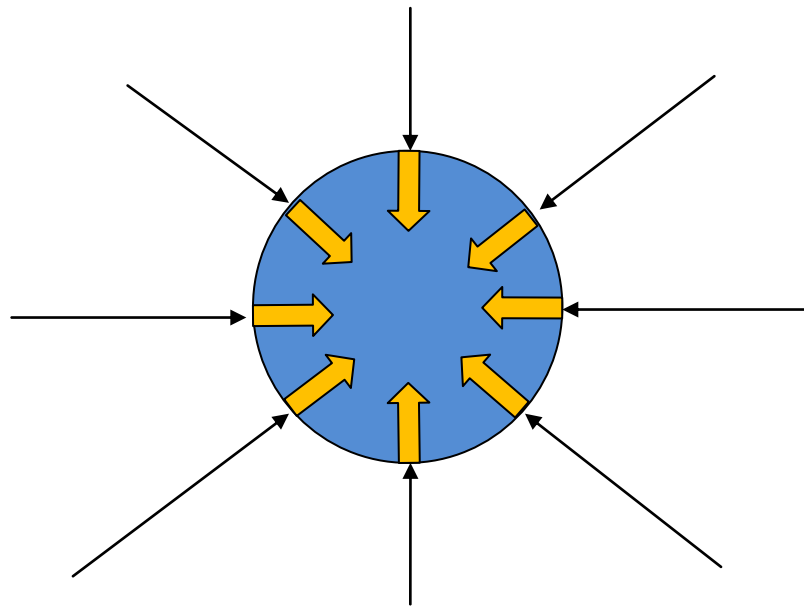


Centrifugal force caused by emitted kinetons is pointing in the opposite direction as acceleration

5. Kinetons as cause for gravity

- 5.1. All accelerating matter in the Universe is emitting kinetons and it creates huge amounts of these particles. Probably the biggest number of these particles is created by rotation of black holes, rotation of stars and rotation of galaxies. Additionally there is also linear acceleration of mass, for example linear acceleration caused by relativistic jets coming from black holes.
- 5.2. Important question is, what happens if kinetons created by acceleration are hitting objects with mass. UGKT is predicting that if kinetons hit an object with mass, there will be reverse process as compared to creation of kinetons. That means that kinetons will convert from particles to kinetic energy and it will cause force acting in the direction of incoming kinetons. This means that in line with Newton's third law there is force which is pushing in the direction of incoming kinetons.

Picture 3: Kinetons (black thin line) incoming from all directions are hitting object with mass and are causing pushing force (orange line)



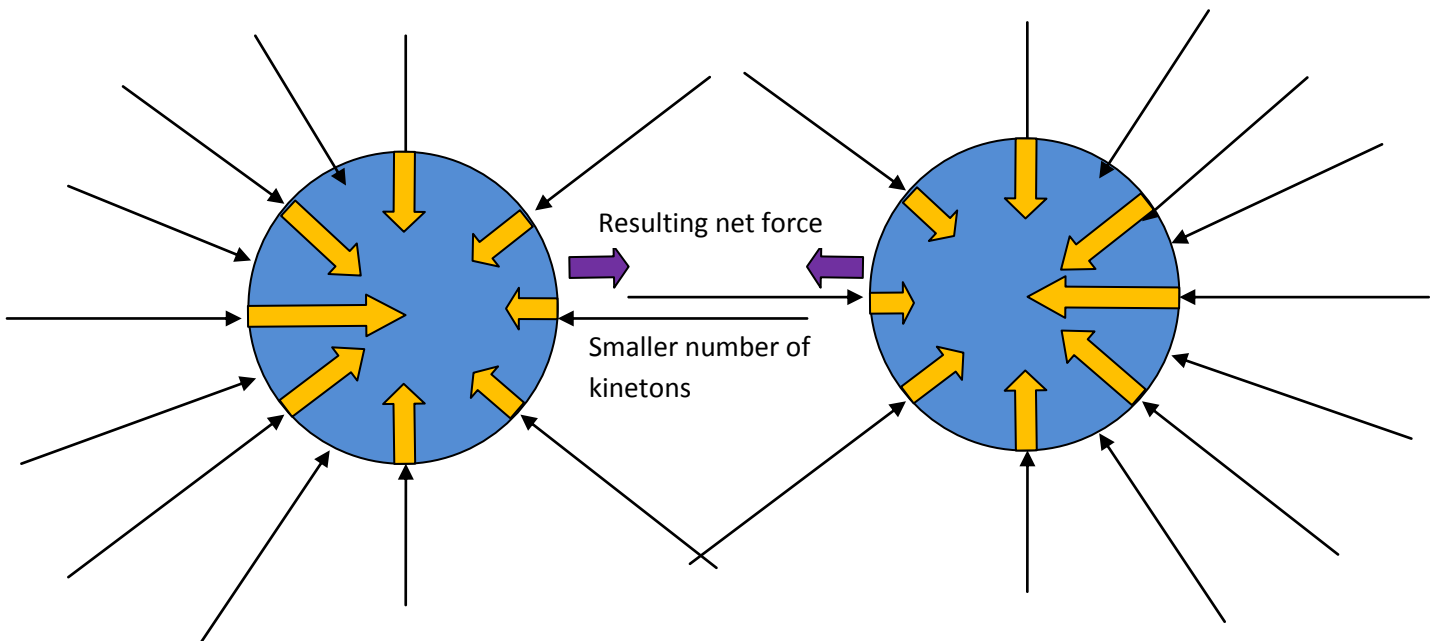
- 5.3. This force caused by kinetons hitting into object with mass is gravity. The described mechanism is similar to so called push gravity or Fatio / LeSage gravity. This push gravity has been tried as explanation for mechanism of gravity many times in history, but there were several predictions of these theories which were not confirmed by experiments or by astronomical observations. Major problems of previous attempts for push gravity were caused by overheating expected because of absorption of energy of impacting particles, drag and aberration caused by speed of

gravity and other issues. New version of push gravity which is integral part of the UGKT theory is solving all these issues and it will be explained in detail in further text.

6. Partial absorbtion of kinetons by mass and the heat problem

- 6.1. Important property of kinetons is that they are only partially absorbed by mass. Level of absorbtion is depending on the density of mass. That means that bigger density of mass is creating bigger gravitational shielding and it is producing gravity force which is appearing to be attractive. This is the main point of push gravity theories of the past and the same mechanism is incorporated into UGT. Kinetons are incoming for all directions but part of it is hitting the mass and is converting into push force which is influencing all particles of mass which were hit by kinetons.

Picture 4: Kinetons (black thin line) incoming from all directions are hitting object with mass and are causing pushing force (orange line), but the partial absorbtion of kinetons is causing difference in pushing forces (gravitational shielding) and the net effect is causing "attractive force" between two objects with mass. The picture is very simplified schematics, actual partial absorbtion mechanism is much more complex.



6.2. One of the main reasons why were previous attempts for push gravity rejected was heat problem. Particles incoming to object of mass from all directions and partially absorbed by the object have been expected to rise temperature of the object. In the kinetic theory, heat is explained in terms of the microscopic motions and interactions of constituent particles, such as electrons, atoms, and molecules. So all ordinary particles with mass which would hit object with mass are expected to increase microscopic motion of particles of that object. But the UGKT is proposing that kinetons act differently than ordinary particles. The energy transfer by kinetons is transmitted in different way than in case of ordinary particles. As already mentioned in 2.2., kinetons are created by pushing force and are causing opposite inertial force. This creation of kinetons is not causing decreasing of heat of the accelerated object, because the energy is directly transformed into creation of kinetons. As explained in point 5.2., when kinetons are absorbed by object with mass, reverse process is taking place, kinetons are converted into pushing force and this conversion process is not accompanied by the increase of heat of the object. Kinetic energy of kinetons is not lost, it is transferred into gravitational pushing force and this process is fully compliant with law of conservation of energy and with mass-energy equivalence.

7. Deeper explanation of the Equivalence principle

7.1. The equivalence of gravitational mass and inertial mass is important principle included into General relativity theory. UGKT is offering much deeper explanation of why there is such equivalence. As explained in previous text, both forces, inertial force and gravitational force have the same source - kinetons. Inertial force is mainly caused by emission of kinetons and gravitational force is caused when kinetons are converted into energy. Both processes are depending on the same mass. There is no difference of gravitational mass and inertial mass in UGKT, it is the same mass, which is either part of creation or annihilation of kinetons. We have to take into consideration also the acceleration as result of imperfect conversion of energy to kinetons.

7.2. Example of Equivalence principle based on satellite orbiting Earth:

The mass of the satellite is attracted to Earth because Earth is absorbing part of kinetons and pushing force caused by kinetons coming from all directions are bigger toward Earth and pushing the satellite downwards to Earth. This pushing force is causing the satellite to emit kinetons toward Earth and because the energy to kinetons conversion rate is not 100% effective, it is also causing acceleration of satellite toward Earth. Kinetons which are absorbed from the direction of acceleration have bigger kinetic energy compared to kinetons absorbed from the other side of accelerated mass and this is causing additional counterforce. Together the resulting pushing force caused by gravity is the same as counterforce caused by emitted kinetons and different kinetical energy of absorbed kinetons caused by acceleration. So the resulting net force is zero and the satellite is orbiting Earth while maintaining zero gravity inside of the satellite. What is important to mention is that this whole process is equal on both sides because both sides of equation or force and counterforce are based on the mass of the satellite. The absorption rate of the pushing gravity is based on the mass and also the creation

of kinetons together with acceleration is linked to the mass of the satellite. The bigger mass of the satellite, the bigger pushing force causing bigger counterforce. This is deeper explanation of the Equivalence principle. At this level it does not bring new predictions, but as will be explained in further points of the text, this approach is definitely leading to new predictions.

8. Explanation of the mechanism causing relativity effects

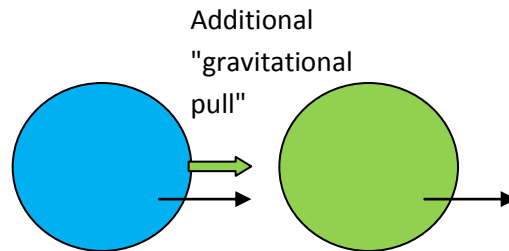
- 8.1. Based on UGKT, the relativity effects like Lorentz contraction of time and space can be mathematically described as geometry of spacetime, but the explanation of underlying cause of relativity is the influence of absorption of kinetons. As already explained in previous chapters, kinetons are coming from all directions. When mass is moving with low speed, the predominant effect of absorbed kinetons is gravity as explained in previous chapter. But when the object of particle is accelerated to speed close to speed of light, other significant influence of absorbed is emerging. As the speed of the object is increasing, the absorption rate of kinetons is increasing exponentially. It is similar to air resistance, which is also growing with similar exponential rate with increasing speed. When using an example of car, when it is increasing the speed on highway, the air resistance is increasing exponentially and at some point the car reaches the point, where the air resistance is so big, that the car can not accelerate anymore and reaches maximum speed with its motor power. The situation with kinetons and speed is similar. Let's take for example an advanced future starship which is increasing its speed with powerful engine. When the speed nears to speed of light the absorption rate of kinetons, which are coming from all directions increases exponentially and at some point the engine of the starship needs extreme amounts of energy to accelerate to even higher speed and as the kinetons are absorbed, they cause the starship to contract and the time is also dilated. Until now we are generally within the bounds of standard description of relativity effects. But I'm proposing, that the situation is slightly different to standard description of Lorentz contractions. The real situation is rather similar to situation of a cabriolet on the highway. If it is increasing the speed, not only the car is feeling the pressure of the air, but due to open car, also the passengers feel the pressure of the air. Similarly to that, the passengers of the starship approaching speed of light would literally feel the absorbed kinetons as increasing mass and increasing contraction. In other words, if the starship would gain the speed of for example 99,99% of speed of light, the passengers would end up as bloody splash within the contracted starship, which gained mass in extreme way including the mass of its passengers. This is major difference to standard special relativity theory. It is important to mention, that this difference is mainly based on different interpretation of existing relativity equations, but the equations used are generally the same as equations used in Special relativity theory and General relativity theory and it is in line with existing relativity experiments and observations.
- 8.2. If the relativity would behave within the proposed UGKT interpretation and not in standard interpretation of Special relativity or General relativity, in some special cases there would be different predictions and measurable effects. If the relativity is caused by the increasing absorption of kinetons, it would also cause additional "gravitational" effects. That means, that

an object flying with high speed would cause "gravitational attraction" behind its trail. This effect would be very tiny with objects with low mass and low speed but it would have significant effects with huge amount of mass or with objects flying with speed near the speed of light.

- 8.3. The change of the additional "gravity attraction" based on the speed of object is based on the Lorentz factor equation. The normal "gravitational attraction" of object is increasing with speed of the object and only in the direction of the movement behind the object.

$$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

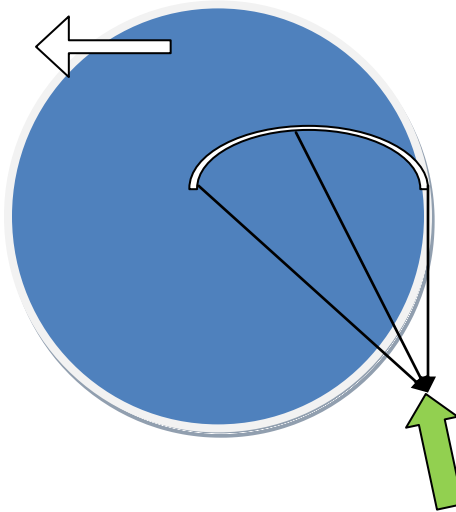
The green arrow is showing the additional "gravitational attraction" caused by the green object moving to the right and attracting the blue object which is also moving in the same direction.



This additional effect is too small to be experienced in normal circumstances. For example Earth is moving within solar system, solar system is moving within Milky way galaxy, which is also moving and the overall net effect is around 371 km/s movement towards constellation Leo relative to Cosmic microwave background. At the speed of 371 km/s is the Lorentz factor 1.0000007657322114, so the additional pull is extremely small.

- 8.4. In generally the "additional gravitational attraction" is too small in normal circumstances to be experienced or measured, but there are cases, in which this effect has visible impact. Majority of these cases are caused by rotation of massive objects like planets, stars and black holes. This is because the rotation is also causing "additional gravitational attraction" but compared to linear movement of objects rotation is causing focusing of this additional attraction to ring around the object.

Direction of rotation of object



Point of ring where the "additional gravitational attraction" reaches focused maximum

Within the solar system, this effect is the primary cause of creation of rings around planets and asteroids. Existing standard theories can not reliably predict, which planet or asteroid will have rings, but UKGT can predict it. The calculations of forces causing the rings are quite complex and I will add it in next version of this paper, but I have prepared table which is showing, that the main factor causing the creation of rings is the speed of the rotation of planet or asteroid. The bigger the speed of the rotation, the bigger the "additional gravitational attraction" which is causing rings to rotate around planet and not fall on planet. Following table shows clear pattern, when rings are depended on rotation and the surface gravity.

Object	Equatorial rotation velocity in m/s	Equatorial surface gravity acceleration in m/s ²	Ratio Rotation velocity / Surface gravity	Comments
Venus	1,81	8,87	0,2	No ring and without moons - due to UGKT because of low speed of rotation
Pluto	13,11	0,62	21,1	Five moons, no ring due to slow speed of rotation
Earth	465,10	9,78	47,6	One moon, no ring due to slow speed of rotation
Mars	241,11	3,68	65,6	One moon, no ring due to slow speed of rotation
2007 OR ₁₀	24,92	0,36	69,2	No ring and without moons
Eris	78,33	0,82	95,5	One moon, no ring
Quaoar	54,76	0,33	168,0	One moon, no ring
Neptune	2 683,33	11,15	240,7	Faint and fragmented ring, does not have a full ring, has 14 moons
Sedna	84,68	0,28	302,4	No moon, no ring
Ceres	94,39	0,28	337,1	No moon, no ring
Vesta	94,13	0,25	376,5	No moon, no ring
Pholus	16,61	0,04	388,1	No moon, no ring
Makemake	161,98	0,40	405,0	No moons, no ring detected yet, due to UKGT there could be a faint ring
Haumea	276,26	0,63	438,5	Two moons, no ring was detected yet, due to UKGT there could be a faint ring
Uranus	4 109,44	8,67	474,3	Clearly visible rings, 27 moons (satellites)
Jupiter	12 661,94	24,72	512,1	Faint rings and big moons which are effectively limiting growth of rings
Chariklo	31,15	0,06	556,3	Two rings detected in line with UGKT but unexpected from standard theories
Chiron	32,13	0,05	636,2	Two rings detected in line with UGKT but unexpected from standard theories
Mercury	3 026,00	3,70	817,8	No moons and no ring because of close distance to Sun
Saturn	10 233,33	10,42	982,5	Biggest ring system in Solar system combined with smaller moons

9. Explanation of dark matter and galaxy rotation problem

9.1. As described in previous point, the rotation is causing "additional gravitational attraction". On galaxy level, matter is rotating around supermassive black hole in the center of galaxy. This rotation of matter is causing "additional gravitational attraction", which increases the pull toward center of the galaxy and increases speed of the rotation. The additional pull is increasing gradually from center to the edge of galaxy and it is causing flat galaxy rotation curve, different to prediction from standard gravity theory. This means there is no need for dark matter galaxy halo, the rotation curve is depending on the visible mass. This was currently confirmed by paper "The Radial Acceleration Relation in Rotationally Supported Galaxies" which established correlation of galaxy rotation curve to visible mass only.

10. Explanation of inflation and dark energy

10.1. As described in previous text, kinetons are emitted by all accelerating objects in universe and are coming in huge amounts from all directions. But this was not the case immediately after Big bang. Big bang started from one singularity, but before the singularity there was no space with kinetons, so there was no inertia and no mass increase caused by relativity. That means, that when the Universe started to expand, the outer edge of expansion was not limited by and inertia or relativity effects, so it expanded by nearly unlimited superluminal speed. This explains the paradox, why there is speed limit equal to speed of light today and why there was no such limit in Universe expanding after Big bang. Today, kinetons which are coming from all directions are causing the "push gravity" but also are causing the accelerating expansion of Universe. This is explanation of "dark energy".

11. Merging quantum mechanics and relativity extended by UGKT

11.1. Bells theorem doesnt allow local hidden variables theory, which means, that there are either multiverses, superdeterminism or non local hidden variables theory. UGKT supports the variant of nonlocal hidden variables theory, because it eliminates problem with causality with supeluminal communication. Relativity in UGKT shows how time dilation arises from effect of absorption of kinetons, which is effectively meaning that time dilation is not caused spacetime itself of deepest level and so it opens doors for particles faster than light, which would not be affected by absorption of kinetons and would allow almost instant communication. This is opening door for deeper explanation of quantum gravity based on non local hidden variables theory based on superluminal speed and thus removing one of the major obstacles in merging quantum mechanics and relativity.

12. Solving problems of singularities (infinities) in General relativity theory

12.1. UGKT expects that there are extremely large numbers of kinetons coming from all directions, but it is important to point out, that this number of kinetons is finite. This means, that when the gravity is caused by finite amount of kinetons being absorbed, there is also upper limit of gravity attraction. This limit is extremely high, but it is there. In observations we see that some black holes are reaching masses of billions Suns, for example the biggest observed black hole is expected to have mass of 40 000 000 000 Suns. But due to UGKT, there is upper limit, where even black holes reach upper limit and there is not a single one kinton which can cross that black hole. This can be used for upgrading equations of General relativity to this limit and effectively eliminate several infinities arising from equations.

13. Discussion

13.1. This is first basic version describing basic principles of UGKT and I plan to upgrade it later in several versions prior to attempt to publish it on arxiv and peer reviewed journals. I understand that this theory is extremely controversial, but it is logical and while it arises from very few basic principles, it can be used to explain complex processes and many open problems. What is important is that it makes specific predictions which can be and I hope which will be confirmed over time. Thanks for your attention.

14. References:

[1] Stephen W. Hawking & George Francis Rayner Ellis (1973). *The Large Scale Structure of Space–Time*. Cambridge University Press. p. 1. [ISBN 0-521-09906-4](#).

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