A unique reality

Relative vs. Absolute - the end of the battle

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#Granular Physics, #Granular Mechanics

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1. Introduction

The reality that surrounds us is based on a very simple operating mechanism, which was already described in my first book, 'Prime Theory'. Exact rules may describe exhaustively its intrinsic mechanics, up to any dimensional scale. Among them, causation occupies a very important place and it gives us, the rational beings, ability to fully understand everything. Precise theoretical models allow us to cover the whole story of our Universe, since the beginning, to understand its evolution and to make predictions for the near and further future.

A lot of theories of modern physics, even some strange ones, often give extraordinary results in limited areas, such as the Standard Model for quantum physics or the GTR for macroscopic physics. The "theory of everything" is missing in this picture, being definitely required to harmonize the models of reality at all scales - as we are dealing, obviously, with a unique reality and unique rules.

'Prime Theory' was intended to be a complete model of reality: it formulates the rules governing our Universe at any scale, reveals the initial absoluteness and its reflection in all material structures, and shows the common denominator of gravity and fields. Moreover, the 'Theory of the Absolute' even allows the integration of the 'Theory of Relativity' into this new paradigm.

All these visions on a unique reality should lead to a unitary descriptive framework, both physically and mathematically. We cannot apply TR in any context, ignoring the absolute within all matter movements. We couldn't have at the same time a functional relative framework, where any IFR is considered perfectly equivalent to another - describing in this way a kind of self-closed, limited universe (however elegant would be this concept), and an absolute framework, where the granular movement determines the state and functionality of all material structures, generating a global spatial nonuniformity. Definitely, there is a speed limitation in our Universe; it is not directly related to the speed limit of light in a vacuum, but to the absolute granular speed. Similarly, objects cannot move at any "speed" through the so-called space-time continuum, and this limitation also originates at granular level, being of absolute nature.

2. The basic assumptions of TR

Let us imagine being in this big laboratory, the Earth, a place where we can make any type of scientific experiments. Here are the general conditions of this lab, seen as a reference frame:

- Rotation around its own axis (0.46 km/s), revolution around the Sun (at about 30 km/s). Moreover, the solar system rotates around the galactic center while it also moves, along with the entire galaxy, with a constant speed (relative to the CMB); overall, we might consider that Earth has an absolute movement, uniform and linear, at about 400 km/s. This velocity will vary slowly in time, as direction and value, and these changes can easily be measured. However, the system as a whole can be regarded as being inertial over short periods of time.

- Dense atmosphere (but transparent), made up especially of oxygen and nitrogen; the atmospheric pressure is approximately 760 mm Hg, and the refractive index is 1.000293 for light (λ = 589 nm).

- Weak gravitational field, relatively constant gravitational acceleration of 9.81 m^2/s on the surface.

This local "universe" allowed physicists to measure the speed of light, more and more precisely, and to eventually declare it a constant. Therefore, an exact value was established for the speed of light in a vacuum, 299 792 458 m/s. Having regard of the refractive index above, the speed of light in the air reaches the value of 299 702 547 m/s, about 90 km/s slower than **c**.

There have been many trials carried out on light, trying to detect the slightest variation in its speed (both in open air and in ultra high vacuum systems), as those performed by Michelson and Morley. In essence, all these measurements have generated constant values for the speed of light, regardless of its direction, and this quickly forced physicists to reject the idea of a special "ether" as propagation medium and speed limitation factor. And there was only one step from this to the postulate stating this speed is as a universal physical constant, having the same value in any IFR. Furthermore, the ideas that all reference systems are equivalent and the laws of physics are the same in all inertial reference frames (invariant) were widely accepted. In other words, the speed of light does not depend on the speed of the source, and any observer will measure the same value.

These things seem to be accurate in a profound relative world, where everything moves and an absolute reference point, to which we could relate this motion, cannot be pinpointed. From a certain inertial frame, an observer will therefore see a "limited", "uniform" world, where nothing can have relative superluminal speeds. Starting from these equivalence hypotheses, the Theory of Relativity (special one) automatically concluded that you can move through space and time at any speed (less or equal to the speed of light), but not simultaneously; therefore, space and time may be regarded as a single entity (called spacetime). Also, the local time becomes relative; it slows down once your speed approaches the speed of light.

Unfortunately, TR was not based on the fundamental mechanism of things; it builds, yet starting from concrete and correct observations and measurements, a mathematical model that is an imperfect reflection of the objective physical reality. Shaping the basic assumptions in accordance with the measurements made in the "earthy universe" and then extrapolating the theory of relativity to the cosmic scale has only created a partially correct framework, which further distorted the natural perspective we should have on things like spacetime and matter.

Paradoxically, the concrete results we have obtained by applying TR are quite accurate. There can be found a number of reasons leading to this, among them the *relatively low speeds* of the planets in the solar system and the *low speeds* of the man-made vehicles and rockets (most observations being performed on Earth or inside the solar system). All tests and analyses should be extended, in principle, to more distant realms and to higher speeds.

3. The basic assumptions of TA

Obviously, it is very difficult to disprove all these assumptions backed by a multitude of experimental data and by the good results of TR calculations. However, could there be a wider framework, which may allow better explanations of reality and where TR could be just a particular case? A framework complex enough to absolutize the movement and to eliminate from it, conceptually, the quasi-total relativization observed on Earth?

Einstein might have said once that the relativity is sufficient to fully explain the world and its physical laws, and to introduce an absolute frame of reference is an "unnecessary complication." In my humble opinion this affirmation oversimplifies things, eluding some essential features of matter and of its dynamics.

A more complex framework, based on the granular model of space, was introduced in my first book [1]; it can better describe the movement of matter, at any scale, and redefines most of the fundamental physical quantities. This framework was later extended (see book [2]) in order to include an essential element - the intrinsic absoluteness of our Universe, and this automatically led to some important changes in all TR's postulates.

This new theoretical construct has started from a simple postulate, telling that the granular speed is constant and absolute; this speed, denoted by ***C***, has been further considered a universal constant (as in [2] and [12], where AFR means its absolute frame of reference). Consequently, the speed of photons in a uniform granular medium is also constant and absolute - and its value will only depend on the spatial fluid's density.

Therefore, the TR's postulate stating the constancy of the speed of light in any IFR is not a universal truth, being in fact a particularization with old observational roots on Earth; it must be adapted and extended, as my variant from TA [2] has already proposed. Moreover, the laws of physics are the same in any IFR, but the proper states of all objects will change with the absolute speed. These two TA postulates are (in simplified form):

- The speed of light is an **absolute speed** in this universe and an upper limit for the actual speed of any granular structure;
- The laws of physics are **identical** in any inertial frame, but their parameters depend on that system's absolute speed and direction (in regard to an AFR).

Theory of the Absolute [2] involves material objects in motion and specifies the way their absolute movement is affecting their internal states:

The proper state of a body in uniform motion can be fully and accurately determined only if its absolute velocity is known (both magnitude and direction).

For example, the local time of an object will only depend on its absolute speed; obviously, it will differ from that of the other objects (travelling at different speeds), but the difference between their local time intervals will not depend directly and exclusively on their relative speed.

4. TR and TA, explanations and implications

These two theories are apparently irreconcilable, although they both claim a constant speed of light in a vacuum; TR claims that the relative movement is determinant and it is sufficient to fully describe the local "physics" of a moving object, while TA says that we must know the absolute speed for a complete description. TR is limiting the perspective we may have on the surrounding "world" from an IFR, while TA enlarges and globalizes it. Reality is unique, and therefore it should be fully described by a single, global and accurate model. It was previously shown (in [2]) the particular case when these theories become compatible (mathematically), if one of those two IFRs moving "relatively" is an AFR and if TR is only applied on it. This is the case in which we may measure and obtain the same speed value c for the light emitted in any direction. Considering this, could we embed TR into TA and continue to use the good results of relativity, just changing the context it may apply? However, we have to explain the real physical phenomena and to give some concrete examples before answering this question and draw an informed conclusion.

Firstly, let's go back to our earthy lab and to its lowest level characteristics, the granular ones. My PT [1] model describes the granular fluid (the medium where all material bodies, particles and photons move) as being formed of spatial granules that move with the absolute speed ***C*** (estimated to be at least **1.4 c**). Using the rules of this level's mechanics, the gravitational fluxes were easily identified and the movement of the upper levels' matter was completely described (with respect to the AFR - that privileged, fixed reference frame in our Universe). But what happens on the Earth's surface, something changes in this granular framework? If our laboratory has this absolute speed (about 400 km/s in this AFR), then why don't we get different values of the speed of light on different directions (the measuring accuracy of 1:1000 being accessible)? The short answer is yes, and the explanation for the same speed values is quite simple.

As it was shown in [3], Figure 14, the granular fluxes on the surface and in the vicinity of big cosmic bodies undergo substantial variations. These fluxes, no matter if they were reflected or if they have crossed that material structure, are all "modulated" by its component particles (we saw how the granules are reflected on the surface of particles - which are completely opaque to the fluxes). These particles are continuously moving, vibrating and rotating; their quantum-scale motion, along with the global translation/rotation of that cosmic body are all reflected in the fluxes modulation envelope. Certain regions of space around the cosmic body are thus crossed by fluctuating granular fluxes; these continuous *fluctuations* have very low intensity values, much smaller than the global gravitational nonuniformity caused by the body "opacity" (as shown in Figure 1, where the flux fluctuations have different shades of gray in a two-dimensional representation of an area parallel with the body's surface). The flux intensity inside those squares varies in time, but it oscillates around the average value of the region - which only changes with the distance to that body. The surface area of those squares is comparable to that of the elementary and composite particles, and this may be simply explained - as the particles and their movements are the source of this phenomenon. All these fluxes with intensity variations (which also mean changes in the local granular density) allow us to state that in areas around the massive cosmic bodies there are

random and continuous fluctuations at the quantum scale (particle dimensions), overlapping the local gravitational nonuniformity (and being proportional with its level).

In other words, any region inside and around the cosmic bodies (planets, moons, stars) undergoes a new "granularization" of its spatial fluid, now at the quantum scale, and the intensity of this phenomenon decreases with the square of the distance to that body (it will be named Quantum Gravitational Fluctuations - CGF). This concept is similar to the *quantum fluctuation* of the modern physics (defined as variation of the energy in a "point in space"), but it does not involve the creation of pairs of virtual particles and it does have a concrete dimensional attribute.

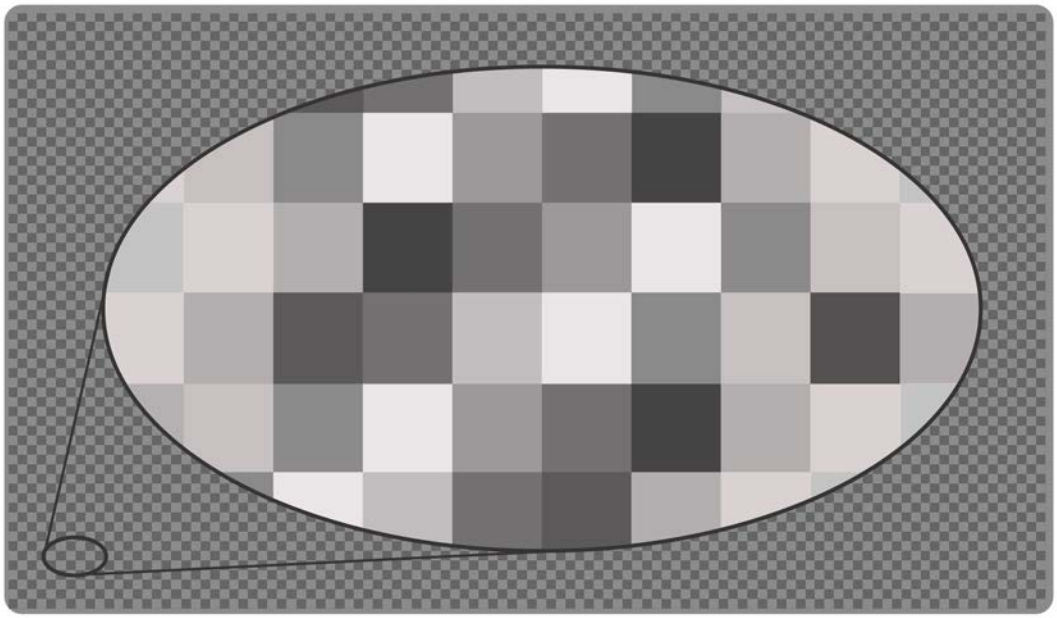

Figure 1 - *A two-dimensional detail of the granular fluctuations*

This new quantum granularization has another interesting property, namely the reproduction of the global movement of the particles (and thus of the body) that generated it. For example, an observer from a space station orbiting the Earth may see how such fluctuations would move synchronously with the rotation of the planet around its own axis, in the same direction. The effects of this new spatial granularization are very important, and all will be listed below.

Explanations

A) Let us imagine a laboratory on an alien planet (an Earth-like one) that does not rotate around its axis, standing still in space (in an AFR). Figure 2, the upper picture, shows a possible quantum granularity distribution on a horizontal surface, a simplified picture that would be displayed by a hypothetical apparatus (in vacuum). Two photons, $\boldsymbol{\gamma_1}$ and $\boldsymbol{\gamma_2}$, emitted by a light source in opposite directions would travel through this quantum granular medium (drawn with equal-size, black and white squares) at the same speed **c**. This medium, seen as average granular density, is uniform on any horizontal direction (we will further ignore the negligible effects of gravity - bending of light and changes of the wavelength).

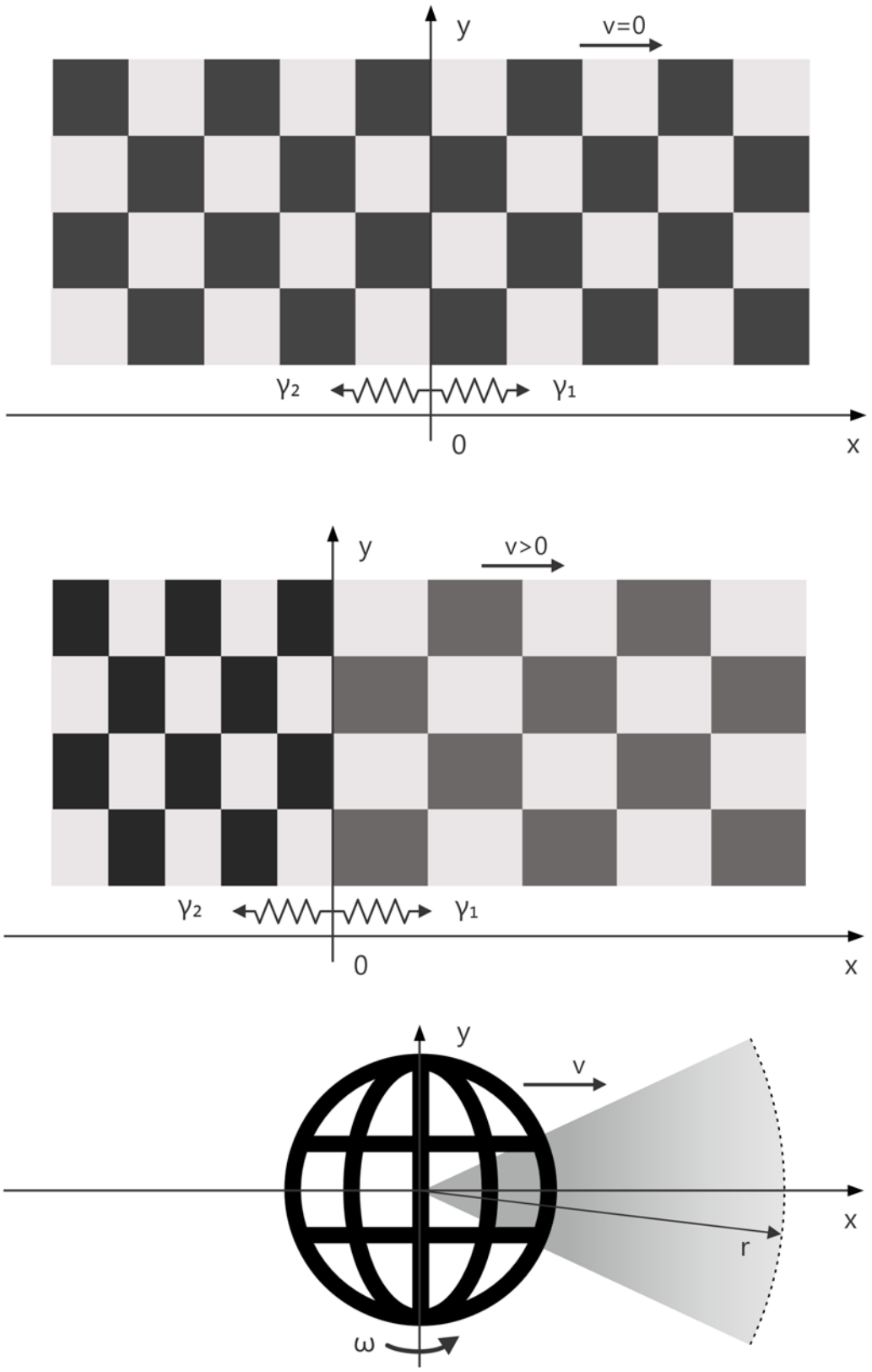

Figure 2 - *Quantum gravitational fluctuations in AFR and IFR*

B) Now let's go back again to our laboratory on Earth, which rotates along with the planet (the angular speed ω and the peripheral one v); the measuring instrument should show the same distribution on the horizontal surface, as it moves simultaneously with the laboratory, the planet and its gravitational field (we currently ignore the revolution and the global motion). Those two photons emitted by a light source, which theoretically should have an absolute movement through space (with speed c in opposite directions), will now "see" a different medium, with a different quantum granularization. Figure 2, the middle picture, shows the structure of this new medium crossed by the photons; the right side reveals a virtually larger size of the new granularity, the photon and the medium having the same travel direction and their relative speed being **c - v**. Things are reversed on the left side, and the relative speed should be **c + v**. Taking into consideration the formula of the speed of light in granular medium ([5], Chapter 3), i.e. its variation with the granular density:

$$\mathbf{v_{light} = C / (1 + \rho \tau C)}$$

in conjunction with the apparent density decrease to the right and increase to the left, we may easily realize why photons have undergone a real variation of speed and how they practically "moved" their absolute point "zero" in synchronicity with the motion of their medium. Photons now move with the normal speed c on both directions, but with respect to a new AFR, namely the lab's IFR.

What if those photons were emitted on the OY axis, upwards and respectively downwards? Obviously, they both will follow the new "straight path"; while moving along the axis at the normal speed **c**, they will be "dragged" to the right with the speed **v**. Their initial directions, presumed to be of absolute kind, are changed and adapted (as on the OX axis) to the local IFR's velocity.

We are facing a significant change in the entire local physics, caused by the "absolutization" of any IFR that moves synchronously (the same speed and direction) with the source of the gravitational field. The QGF phenomenon (produced by gravity, i.e. by the presence of a massive body in space) becomes dominant in all regions with a certain intensity of the gravitational field, extending around on a sphere of maximum radius **r** (Figure 2, the lower picture). All fluctuations have very small amplitudes at this distance, reaching the natural level of the empty space. However, these fluctuations are combining in a point in space, and their addition formula is similar to the gravitational fields' one; the most intense source will thus impose the physics in that place.

Implications

A) Experimental detection of the "ether" by measuring the speed of light on various directions (Michelson-Morley type experiments) cannot have a positive outcome, even in a perfect vacuum. The QGF phenomenon occurs at granular level, changing the fundamental structure of space; it will affect any measurement, on any direction inside the sphere of that radius. In order to succeed, this kind of experiments must be carried out in a distant place (far away from the gravitational fields). As an alternative, the light sources might have significantly higher speeds with respect to the "local absolute".
B) This change of the local physics involves changes in the physical movements of particles and atoms; the entire dynamics of the quantum "world" is affected by the new "local absolute".
C) If we leave the Earth's sphere of influence, the Sun would be the next major player in our solar system; farther away, the galaxy and its central black hole are counting in this picture. However, the intergalactic space is in fact that cosmic region with no such fluctuations.

D) It is obvious now, TR may be applied successfully in this local absolute frame. All postulates of special relativity are valid in these systems with local gravitational fields and low absolute speeds, and the adjacent constructs (Lorenz transformations, Minkowski space, GTR and its formalism) are now making sense.

E) What is the absolute speed one massive body may have, so that the QGF phenomenon would still cause the absolutization of local physics as described? The answer depends on the exact value of granular speed *C;* if we consider $\boldsymbol{C} \cong \mathbf{1.4\ c}$ (as in [1]) we can estimate the value of that maximum speed to $\boldsymbol{C}\mathbf{- c = 0.4\ c}$. This quantum phenomenon is thus present in most cosmic systems (including Earth, with its absolute speed of about 400 km/s).

F) Does the local time of these systems differ from the absolute one, of maximum rate, in our Universe? Yes, time is dilating in these systems, all their components move at a certain global speed that produces changes to the granular impulses of particles. Therefore, the temporal comparisons made in [2], Chapter 3.4, are all valid; we have to pay more attention the moment we leave the relative zone of a gravitational field and apply TA instead. The rates of time must be compared by using TR inside of a system and by using TA between different systems or places.

G) Let us consider an ideal system, free of gravity (for example a spaceship crossing the intergalactic space), where we would like to measure the local time. A light clock will be used to that purpose (like the one described in my article [11], Chapter 6); all TA conditions are fulfilled and the absolute speed of the ship, *v*, is known. With respect to the local IFR, the absolute speed of light (denoted by *u*) may have different values, as in this formula:

$$u = \sqrt{c^2 - 2\,c\,v\,cos\,\alpha + v^2}$$

(α being the angle made by photons with the ship's direction of travel).

If this clock would use omnidirectional light pulses, the factor of time dilation is slightly smaller than the TR's one, according to this formula (numerically tested):

$$\Delta t' / \Delta t = 1/\pi \int_0^{\pi} \frac{c}{\sqrt{c^2 - 2\,c\,v\,\cos x + v^2}}\,dx$$

The definite integral over a semicircle interval is due to the obvious spatial symmetry. Replacing v/c = β, it yields:

$$\Delta t' / \Delta t = 1/\pi \int_0^{\pi} \frac{1}{\sqrt{1 - 2\,\beta\,\cos x + \beta^2}}\,dx$$

5. Conclusion

This article helped solving, in my opinion, the most important incompatibility or inconsistency of the modern physics: on the one hand, the absolute spatial medium and its special mechanics (described in [1] and [2]); on the other hand, the Theory of Relativity. My explanation was based on a changed structurality the granular space gets in the presence of massive bodies, i.e. of the gravity. This new phenomenon has been named CGF and it is in fact the consequence of an additional granularization of space, which is imposed by the presence of a structure with numerous particles (atoms and molecules). Consequently, all of the local granular fluxes are affected, being

modulated and combined at quantum scale by the interactions with the dense matter; in fact, a matrix with the instantaneous distribution of that matter is superimposed over the uniformity of the local fluxes. A significant cosmic mass will "mark its territory" in this way, changing the fabric of the surrounding space and leaving a trace of its global movement. We may say now that the gravity influences the entity called local spacetime on two planes, through direct action on matter and through the absolutization of its dynamics. Theory of Relativity may thus be applicable in any local context, but only if we identify the local absolute system. In case of global situations or of zero gravity we should use instead the Theory of the Absolute.

Abbreviations and Acronyms

CMB - The Cosmic Microwave Background

Big Bang - A theory on the universe's birth

"Abc" - Figurative language

QGF - Quantum Gravitational Fluctuations

AFR - Absolute Frame of Reference

FR - Frame of Reference

IFR - Inertial Frame of Reference

SR - System of Reference

TR - Theory of Relativity

GTR - General Theory of Relativity

TA - Theory of the Absolute

PT - Prime Theory

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