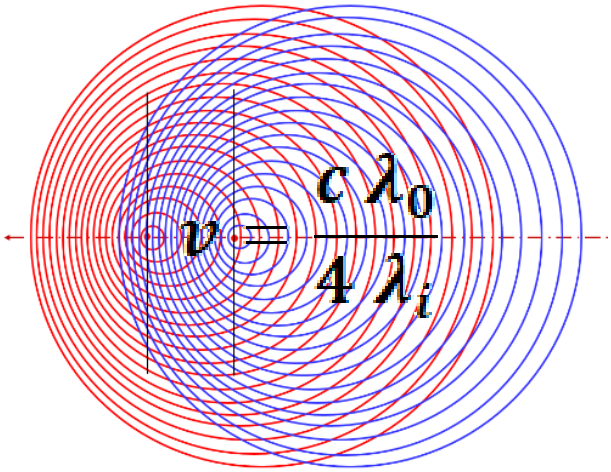
Zygmunt Dzięgielewski *25-12-31*

If there is a physical quantity in any space, then that space is material space.

Theory of Real Physics

Measurement of Absolute Velocity Vector and Gravitational Vector in Singularity Space (4D)



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Abstract

This paper presents a new, comprehensive physical theory – the **Theory of Real Physics (TFR),** as a result of the discovery that the space of a vacuum is not an empty space if interactions are carried in the vacuum and the Doppler effect occurs in it.
On this basis, the construction of the **ZDIS Interferometer-Scanner measuring device**, designed to measure the velocity and gravity vector in the space of Vacuum – Singularity, became realistic.
TRP assumes the existence of a fundamental transparent material medium, referred to as the **Singularity (4D),** composed of particles called Duons, forming a quantum liquid on the Planck scale, which is an absolute frame of reference and the fourth geometric dimension (4D) of the baryonic Universe (3D).
TPR redefines key physical concepts such as matter, mass, energy, time, and field. Within the Singularity (4D), two subspaces have been distinguished:

- **Dark Matter ($4D_1$),** which is a carrier of gravitational interactions,
- **Ether ($4D_2$),** which is a carrier of electromagnetic interactions.

The photon and neutrino are interpreted as quanta of wave energy in the subspaces of the Singularity, and not as particles of the Standard Model.
A key element of this work is a new interpretation of **the Hafele-Keating experiment**, confirming the existence of the Singularity as a material space, constituting a frame of reference in which the speed of light *c* is an absolute velocity. This experiment was also used to determine the velocity of the Earth's surface in the space of Singularities.
The paper introduces the concept of **the ZD Interferometer-Scanner (ZDIS)** – an innovative device designed to measure the absolute velocity vector and the gravity vector in the space of Singularities. The autonomous navigation device provides absolute speed and orientation data, independent of weather conditions and external signals such as GNSS.
TPR proposes the unification of physical phenomena, offering new insights into gravity, electromagnetism, quantum entanglement, and the nature of time, postulating the possibility of cloning Newtonian reference time.

Keywords: ZDIS, theory of real physics, singularity, mass, matter, dark matter, dark energy, gravity, ether, photon, neutrino, absolute velocity, Newton's time, Einstein's time, time dilation, time cloning, quantum entanglement, Hafele-Keating experiment, ZDIS.

Introduction

This paper presents the **Theory of Real Physics** (**TRP**) and its practical application: **ZD Interferometer-Scanner (ZDIS).**

Precise determination of position and velocity is the foundation of modern navigation – from land and sea applications to space exploration. Modern systems such as Global Navigation Satellite Systems (GNSS) provide unparalleled accuracy, but they have inherent weaknesses, including the ability to disrupt signals, jamming, and dependence on external infrastructure. This dependence highlights the critical need for autonomous, self-sufficient navigation systems, capable of providing absolute measurements of velocity and gravitational field.

For over a century, since the groundbreaking Michelson-Morley experiments, which, due to the method used and the insufficient precision at the time, could not yield a positive result, the search for a way to measure absolute motion in space remains a central challenge in physics, with profound implications for navigation. Conventional approaches are based on the framework of Einstein's theory of relativity, which postulates the absence of a privileged frame of reference. However, an alternative interpretation of experimental evidence, such as the Hafele-Keating experiment, suggests the existence of a material medium—a fundamental frame of reference.

Albert Einstein's Special Theory of Relativity, from the early twentieth century. was based on the following two postulates:

1. The principle of relativity
   The *principle that the laws of physics are the same in all inertial frames and are valid for all laws, both mechanics and thermodynamics.*

2. Constancy of the speed of light
   The *speed of light in a vacuum is the same for all observers, the same in all directions, and does not depend on the speed of the light source.*

The postulates show that:

- Light does not belong to any inertial system, none of the Observatories in the Universe (3D).
- Light does not belong to the space of the Universe (3D).
- Nor does light belong to the inertial system of its source (3D).
- Light belongs to the space in which its propagation takes place.
- Light belongs to the space of the Vacuum (Singularity), which fills the entire space of the Universe, including its baryonic matter.
- The singularity is the fourth dimension (4D) of the three-dimensional Universe (3D), where all physical phenomena and interactions take place.

In view of the above, the following postulates have been made:

1. **The principle of relativity (Albert Einstein)**
   The principle that the laws of physics are the same in all inertial frames and are valid for all laws, both mechanics and thermodynamics.
2. **The principle of materiality of space**: If there is any physical quantity in any space, then that space is not empty space - it is a material medium
3. **Wave propagation rules**:

   - *The propagation velocity of a wave, in a homogeneous wave carrier, is the same for all directions and independent of the velocity of its source in that carrier.*
   - *The wave carrier determines the speed of wave propagation.*

Analysing the above postulates, the conclusion was that using the appropriate laser technique, it is possible to build a measuring device that measures the absolute velocity vector and the gravity vector in the space of Vacuum (Singularity). Such a device (3D), based on the use of the Mobile Observer, in a (3D) system, was named: "**ZD Interferometer-Scanner (ZDIS)**". In this device, the Mobile Observer (3D) can observe the interference wave (4D) as a standing wave and measure its length directly in the space of the Singularity (4D).

TRP postulates that the Vacuum is not empty, but is a material medium, called **the Singularity (4D).** This medium consists of a quantum liquid on the Planck scale and acts as an absolute frame of reference, constituting the fourth spatial dimension in which the three-dimensional Universe is embedded. In this medium (Singularities), two subspaces have been distinguished: the gravitational subspace (Dark Matter) and the electromagnetic subspace (Ether). This work aims to combine a theoretical foundation with a practical instrument, proposing a path towards a new class of navigation technology. Such technology could potentially operate independently of GNSS, offering a robust and absolute method for determining the state vector of a ship in any environment, thus solving a fundamental limitation in the field of navigation.

ZDIS is a novel measuring device designed to directly measure the absolute velocity vector and the local gravity vector in the space of Singularities. Using the Mobile Observer principle and measuring the properties of the generated standing interference wave, ZDIS theoretically allows the determination of absolute motion without external references. This methodology represents a paradigm shift with respect to the relative measurements of current inertial navigation systems

1. ZD Interferometer-Scanner (ZDIS)

Measurement of Velocity and Gravity Vectors in Space Singularities (4D)

1.1. Introduction

ZD Interferometer Scanner, is a measuring device (3D), designed to measure velocity and gravity vectors in the space of Singularity (4D).
Previous attempts to measure the absolute velocity in the Universe, initiated by experiments conducted in the 1880s by Michelson and Morley, were unsuccessful because the measurement methods and devices used at that time, using the Stationary Observer (SO), could not yield the expected results.
The light waves belonging to their propagation space, the Singularity (4D), emitted by the source F_0 (3D), at the time of emission, no longer belong to its inertial frame of reference (3D), but to the carrier system (4D), i.e. the electromagnetic subspace of the Singularity ($4D_2$) – the fourth geometric dimension of the Universe (3D).
To measure the velocity ("***v***") in the Singularity space (4D), from the measuring device system (3D), it is necessary to use a Mobile Observer (MO), which, observing the interference wave λ_i (4D), generated by the measuring system, will perceive it as a standing wave and, by scanning, will be able to directly measure its length in the Singularity space (4D) from its system (3D).

1.2. Measurement method

The method of measuring the velocity vector in space is a universal method, applicable in gaseous, liquid or Singular space, for velocities lower than the speed of wave propagation in these spaces. The method consists in measuring the size (length) of the physical phenomenon of interference of coherent waves, emitted from one source, then separated and directed opposite to each other, causing the formation of an interference wave ***λi*** in space. The length of the interference wave **λi** depends on the velocity "*v*" of the source (F_0) of coherent waves in space. This property was used in the ZDIS measuring device to measure the magnitude of the absolute velocity vector and the gravity vector in the space of Singularities.

1.3. Principle of Operation of the ZDIS

The ZDIS measuring device measures velocity *v* in space by measuring the wavelength of the standing light interference wave *λi*, generated by the device. This device utilizes the double Doppler effect and an open optical system, as opposed to the closed system used in the Sagnac gyroscope.

1.4. Applications

- Astronautics,
- Space and Near-Earth Research,
- Satellite geodesy,
- Aviation,
- Fast ground vehicles,
- Construction of reference clocks and time cloning.

1.5. Measurement of velocity in space

In order to measure the velocity (v) in the Singularity space (4D) from the measuring system (3D), the **Mobile Observer (MO)** should be used. This observer will observe the interference wave λ_I (4D) generated by the measuring system and will see it as a standing wave. Then, using scanning, the Mobile Observer (MO) from its system (3D) will be able to measure it directly in the Singularity space (4D),

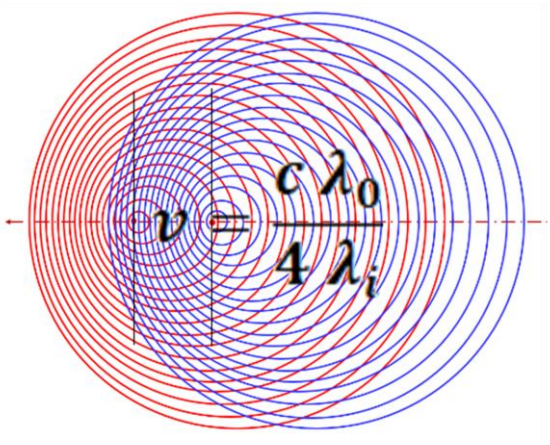


Fig. 1. *Scheme of the propagation of coherent electromagnetic waves emitted from a single source* $\boldsymbol{F_0}$ *(3D), moving in the space of Singularity (4D) at a velocity* $\boldsymbol{v}$ **.**

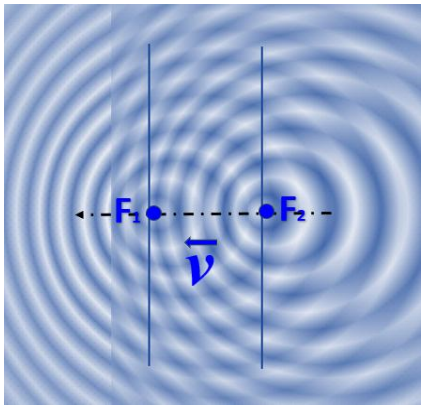
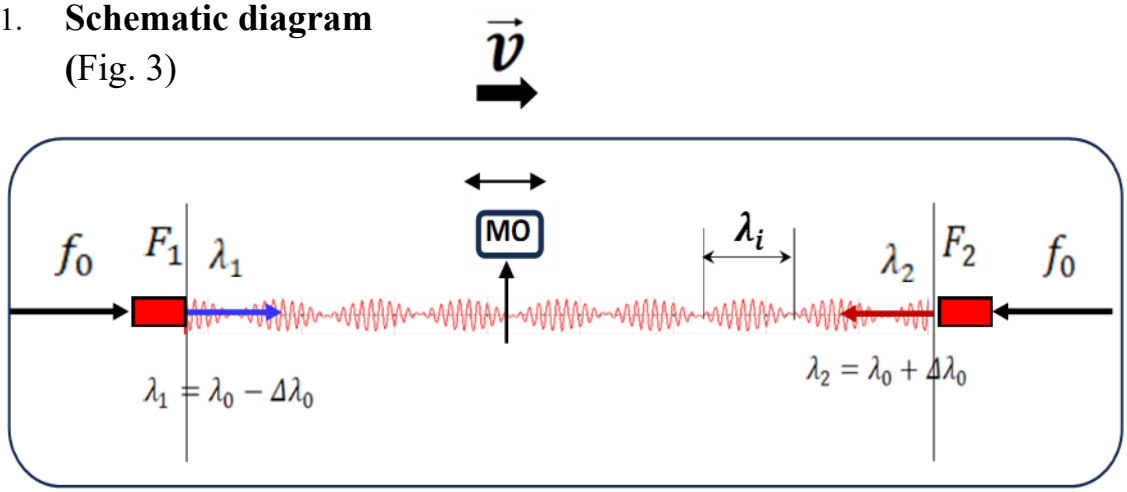


Fig. 2. *Interference of coherent electromagnetic waves, emitted from a single* ***source*** *F0 (3D), moving in the space of Singularity (4D) at a velocity* ***v*** **.**

1.6. Calculation of the interference wavelength λ_i

1.6.1. Schematic diagram (Fig. 3)



Where:

v – velocity of an object in space (4D)
c – speed of light (4D)
F0 – light source with frequency
F1 - F2 – sources of coherent waves
f0 – the wave frequency of the light source (in 3D).
λ_0 – wavelength of the light source (w3D).
λ_i – interference wavelength (4D).
MO – Mobile Observer

1.6.2. Calculation of the interference wavelength λ_i

For low source speeds **F₀** (3D**)** in the Singularity space, the wavelength relationship of the source is not taken into account **F₀** from speed **v**, nor the influence of gravity. If necessary, you can apply corrections.

We calculate according to the scheme above:

1. $\lambda_1 = \lambda_0 - \Delta\lambda_0$;
2. $\lambda_2 = \lambda_0 + \Delta\lambda_0$;
3. $\boldsymbol{\Sigma\lambda_{1-2}} = \lambda_0 - \Delta\lambda_0 + \lambda_0 + \Delta\lambda_0 = 2\lambda_0 =$ **constant**

The sum of the number of wavelengths directed opposite to each other, on a certain length segment, is a constant quantity.

4. $\Delta\lambda_1 = \Delta\lambda_2 = \Delta\lambda_0$
5. $\lambda_i = (\Delta\lambda_0/2)/2$
6. $\lambda_i = \Delta\lambda_0 / 4$
7. $\Delta\lambda_0 = 4\lambda_i$

The length of the interference wavelength is inversely proportional to the velocity We obtain the relationship**v**.*:*

8. $\Delta\lambda_0 / \lambda_0 = v/c$;
9. $4\lambda_i / \lambda_0 = v / c$;
10. $\lambda_i = (c * \lambda_0) / (4 * v)$

The length of the interference wavelength in the space of the Singularity is:

11. $$\boldsymbol{\lambda_i = \frac{c\,\lambda_0}{4\,v}}$$

After transformation:
Absolute speed *v* in the space of Singularities (4D) is:

12. $$\boldsymbol{v = \frac{c\,\lambda_0}{4\,\lambda_i}}$$

For other spaces:

13. $$\boldsymbol{v = \frac{v_0\,\lambda_0}{4\,\lambda_i}}$$

Where:
$\boldsymbol{v_0}$ – speed of wave propagation in space

Space	v_0	f_0	λ_0	λ_i	v	
	m/s	Hz	m	m	m/s	km/h
Air	346	200 000	0,0017	1,000	0,15	0,54
Water	1 500	100 000	0,0150	1,000	5,63	20,25
Singularity	299 792 458	656 144 578 682 425	4,569E-07	1,000	34,24	123,26

Table 4 *Examples of velocities for interference wavelength = 1000 mm, for different material spaces, and wavelength* $v, \lambda_i \lambda_i$ *for the speed of the Earth's surface at Stockholm latitude.*

2. Experiments

2.1. The experiments were conducted only in terms of the correct operation of the mobile model of the ZDIS device as a digital measurement system.
Speed measurement in space, at speeds > 500 km/h, was not carried out, due to the lack of access to such capabilities. The interference wavelength decreases with speed, leading to greater measurement accuracy and smaller measuring device sizes.
The theoretically predicted results are presented in Table no.5, based on calculations, taking into account the specific parameters of the components used in the construction of ZDIS:

Light source F_0 - Laser 457-04-01 by Cobolt AB,
Source wavelength λ_0 – 4.569 * $(1 \pm 1 \cdot 10^{-9})$ [nm]
Frequency f_0 – 6.56 144 578 682 425 * $(1 \pm 1 \cdot 10^{-9})$ [Hz]
Stability < 1 pm over 8 hours
Short-term stability < $1 \cdot 10^{-9}$,
Velocity range v: 33 – 30,000 [m/s];
Propagation velocity c – 299 792 458 [m/s]

Table 5. *Table of velocities v for selected objects, depending on the interference wavelength* λ_i*, for a wave source* ***F0*** *with wavelength* $\lambda_0 = 456.9$ *nm.*
Where: γ_v; γ_G *are time dilation coefficients.*
The practical operating range of the device is marked in green.

The objekt of motion	λ_0 [nm]; f_0 [Hz]	$\Delta f = 2f_0\frac{v}{c}$	$\lambda_i = \frac{c\,\lambda_0}{4\,v}$	$\gamma_v = \frac{1}{\sqrt{1-\frac{v_0^2}{c^2}}}$	$\gamma_G = \frac{1}{\sqrt{1-\frac{2Gm}{c^2 r}}}$
	4,5690000E-07				
	6,5614458E+14	Δf	λi		
	Speed [m/s]	[Hz]	[m]	γv - 1	γ_G - 1
Light	**299 792 458,000**	-	-	-	-
The speed of the Sun in space, acc. to Dr. Janusz Kępka	5 000 000,000	2,1886627E+13	6,8487587E-06	1,3911028E-04	
The solar system around the Galaxy	230 555,560	1,0092167E+12	1,4852729E-04	2,9571952E-07	
Earth around the Sun	29 760,000	1,3026921E+11	1,1506651E-03	4,9271349E-09	6,95E-10
Earth on the eqator	462,960	2,0265266E+09	7,3967067E-02	1,1923795E-12	6,95E-10
Sound	330,000	1,4445174E+09	1,0376907E-01	6,0573768E-13	6,95E-10
Velocity in space on the Earth's surface (Washington)	**196,000**	**8,5795579E+08**	**1,7471323E-01**	2,1360691E-13	6,95E-10
Velocity in space on the Earth's surface (Stockholm)	**128,450**	**5,6226745E+08**	**2,6659240E-01**	9,1926466E-14	6,95E-10
Minimum measuring speed of the ZDIS device	**34,240**	**1,4987962E+08**	**1,0001108E+00**	6,4392935E-15	6,95E-10
Car	33,000	**1,4445174E+08**	1,0376907E+00	5,9952043E-15	6,95E-10
Cobolt laser resolution 456.9 nm, for 10E-9 stability	33,000	1,4445174E+08	1,0376907E+00	5,9952043E-15	6,95E-10
Resolution using krypton K-86	1,816	7,9492230E+06	1,8856714E+01	0,0000000E+00	6,95E-10
Human	1,600	7,0037207E+06	2,1402371E+01	0,0000000E+00	6,95E-10
Resolution using cesium Cs-133; 9 192 631 770 Hz	0,033	1,4445174E+05	1,0376907E+03	0,0000000E+00	6,95E-10
NASA laser resolution, for stability 10E-17	0,003	1,3131976E+04	1,1414598E+04	0,0000000E+00	6,95E-10

2.2. The Hafele-Keating experiment

(Confirmation of the Theory of Real Physics)

The Hafele-Keating experiment took place in October 1971 and consisted in measuring the time difference of atomic clocks on board a Boeing 747 aircraft traveling around the globe. The plane made two flights - one to the east and one to the west. The reference ground clock used to compare its time with the time of the clocks on board the aircraft was located at the United States Naval Observatory, located at the coordinates: **38°55'17.23"N**; **77°4'59.36"W**.

During the H-K experiment, in 1971, an airplane with clocks on board flew at a latitude close to **39°N**. The experiment, despite technical difficulties and financial limitations, was carried out correctly and provided reliable results. It should be noted here that the time difference between clocks flying east and west was created practically only during flight.

The experiment confirmed the phenomenon of the "relativistic time effect", i.e. that the passage of time of an observer moving in the space of the Universe depends on his speed of movement.

The Hafele-Keating experiment focused only on the effect of velocity of motion on the passage of time, as the relationship between time and gravity had previously been confirmed.

The results of the experiment not only met the expectations, but exceeded them, making the authors of the experiment unable to fully interpret them.

interpret. The Hafele-Keating experiment became an important, but underestimated, step in the development of physics, which confirmed not only the relativistic effect of time, but also the existence of the space in which this experiment took place.

2.3. Results of the H-K experiment

Difference in the time indications of the clocks traveling by airplane compared to the indications of the ground clock**:**

Flight to the east: $\Delta t_1 = \sim 59 \pm 10$ ns
Flight to the west: $\Delta t_2 = 273 \pm 7$ ns

2.4. Interpretation of the results of the H-K experiment according to TPR

2.4.1. **Calculation of the dilation of Einstein's relativistic time (TE0)** with **respect to Newton's reference time (TN0)**

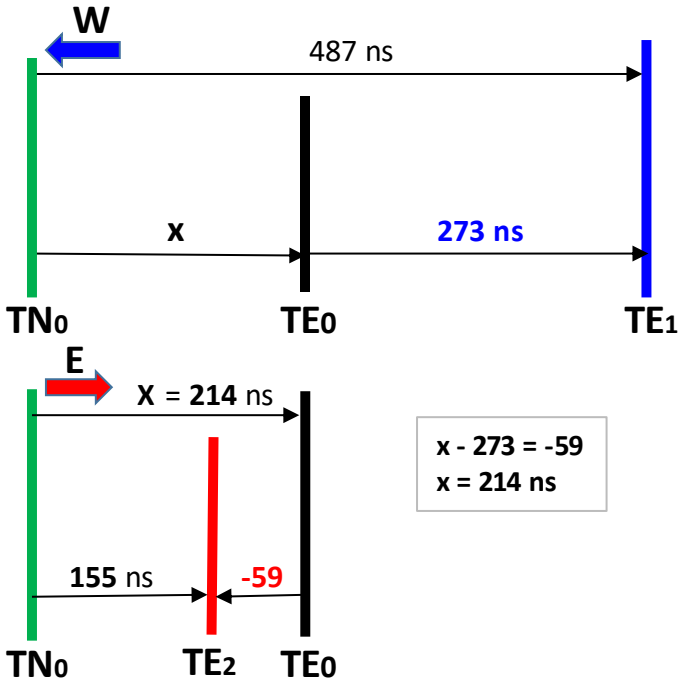


Fig. 6 *Distribution of times during the H-K experiment*

Where:

- **TN0** –-Reference Newtonian time **TN0 = 0**
- **TE0** –- Reference Time Dilation, Relativistic Ground Clock
- **TE1** –- Relativistic time dilation of clocks flying to the West
- **TE2** –- Relativistic time dilation of clocks flying to the East.

2.4.2. **Relativistic time dilation** terrestrial clock during the experiment.

TE0 = x = 214 [ns]
TE0 = **214** ns

2.4.3. **Calculation of the speed of the terrestrial reference clock TE (3D), in the space of Singularities (4D)**
(Without taking into account the influence of gravity on the measurement).

Assuming:

- Boeing 747 Aircraft Cruising Speed: VB747 = 250 m/s
- Time dilation, clocks flying west: TE1 = 273 n
- Time dilation of clocks flying east: TE2 = -59 ns
- Einstein time Dilation: TE0 = 214 ns.

We calculate:

the absolute speed of the ground clock (TE) from the proportion:

14. VB747 / VTE = TE1/TE0
15. VTE = 250 * 214/273 = 196 [m/s]

The absolute speed of a ground clock (TE) in Singularity space, at the latitude of Washington State, is:

16. VTE = 196 m/s

Linear velocity of the Earth, at the latitude of Washington:

17. VW = VR * cos φ
18. φ = 38,9 ^{O}
19. cos 38.9 ^{O} = 0.7782
20. VR = 463 m/s
21. VW = 463*0.7782 = 360.3 [m/s]
22. VW = 360.3 m/s

Latitude	ϕ	Cos ϕ	v_E	v_S [m/s]	v_S [km/h]
Equator	0,00	1,0000	463,00	251,86	906,71
Washington	**38,90**	**0,7782**	**360,31**	**196,00**	**705,60**
Stockholm	59,31	0,5100	236,13	128,45	462,40

Table 7. *Velocity of the Earth's surface in the space of Singularities, resulting from the Hafele-Keating experiment, for selected cities.*

Where: v_E *– linear velocity of the Earth.*

v_S *– velocity in the space of the Singularity.*

2.5. Conclusions from the Hafele-Keating experiment

2.5.1. Asymmetry of the time difference, clocks flying east and west:
$\Delta t_1 = +273$; $\Delta t_2 = -59$ [ns], confirms the existence of the material space of the Singularity as the fourth geometric dimension (4D), the Universe immersed in it (3D). It is a confirmation of the correctness of the Theory of Real Physics.

2.5.2. In the absence of a material medium, which is the space of the Singularity(4D), or in the case of its static, symmetry would be maintained.

2.5.3. The H-K experiment confirms the existence of two times:

- Newtonian reference time **TN** (4D).
- Einstein's relativistic time **TE** (3D).

2.5.4. The dilation of Einstein's relativistic time (3D) relative to Newton's reference time is measurable.

2.5.5. Newtonian reference time (4D) can be cloned.

2.5.6. 23. $V_{TE} = 196$ m/s $< V_W = 360.3$ m/s
This inequality means that the space of the Singularity (4D) follows the motion of the Earth (3D), as a result of the interaction (gravitational viscosity) of the gravitational masses of the Earth (3D) with the matter of the Singularity (4D).

3. Definitions and postulates of the Theory of Real Physics (TRP),

as a logical consequence of the principle of operation of the innovative measuring device (ZDIS), including the application of the Mobile Observer for measurement.

3.1. Matter

Everything that has mass is material, everything else is not.

There are two types of matter in the space of the Universe:

3.1.1. Atomic matter (baryonic)
3.1.2. Matter of Singularity

3.2. Mass

Mass is synonymous with materiality.

3.2.1. Mass has a causative power.
3.2.2. Mass has energy.
3.2.3. Mass is a carrier of energy.
3.2.4. The mass of atomic matter is the "charge" of gravitational interaction in the gravitational space of the Singularity (Dark Matter), as well as the electric charge in the electromagnetic space of the Singularity (Ether).

3.3. Energy

Energy is the ability of mass to do work.

3.3.1. Energy is an attribute of mass.
3.3.2. Energy has no mass.
3.3.3. Energy is not material.
3.3.4. Energy is information.
3.3.5. There is no free energy.
3.3.6. There is no energy of anything.
3.3.7. The energy used to create the field is the energy of the field.
3.3.8. The energy of a wave is the kinetic energy of the oscillating masses of its carrier.
3.3.9. The background wave energy is the energy of the electromagnetic subspace of the Singularity ($4D_2$).

3.4. Field

The order in Space field creates a field.

3.5. Field Energy

The energy used to create the field is the field energy.

3.6. Speed of light

The speed of light, c, is the absolute speed of propagation of electromagnetic and gravitational waves, relative to their medium - Singularity space (4D).

3.7. Work

Work is a transformation of energy.

3.7.1. During every physical phenomenon there is a transformation of energy.

3.8. Singularity (4D)

Singularity is a transparent material medium, forming space (4D), in which all physical phenomena occur, in which the Universe is immersed (3D).

3.8.1. Singularity creates unlimited space (4D).
3.8.2. The singularity (4D) forms the fourth geometric dimension of the three-dimensional Universe (3D).
3.8.3. The space of the Singularity is not dependent on time.
3.8.4. In its space, the Singularity can contain many Universes, forming a Multiverse.
3.8.5. Matter of Singularity (4D) is involved in all physical processes in the Universe (3D).
3.8.6. Matter of Singularity (4D) is a clutch of quantum entanglements of atomic matter (3D).
3.8.7. The singularity (4D), as a material medium, determines the speed of propagation of electromagnetic and gravitational waves in the Universe (3D).
3.8.8. Singularity is a carrier of electromagnetic waves and fields.
3.8.9. Singularity is a carrier of waves and gravitational fields.
3.8.10. Singularity is a carrier of an electromagnetic background.
3.8.11. The singularity is a carrier of electromagnetic and gravitational wave energy in the Universe.
3.8.12. A singularity does not have its own temperature.

3.9. Matter of Singularity (4D)

Matter of Singularity (4D) is a quantum liquid, formed by Duos (pairs of bipolar spins of Deons), with quantities of the Planck magnitude level (10E-35m).

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3.9.1. The Matter of Singularity (4D) forms two subspaces:
3.9.1.1. Gravitational subspace of Dark Matter ($4D_1$).
3.9.1.2. Electromagnetic subspace of the Aether ($4D_2$).
3.9.2. The density of matter in the space of Singularities (4D) depends on the strength of the gravitational field created by the masses of atomic matter (3D) immersed in it.
3.9.3. Matter of Singularity (4D) and atomic matter (3D) are subject to the law of conservation of mass and the law of conservation of energy.
3.9.4. Matter of Singularity is subject to the laws of flow.

3.9.5. The independent occurrence of electromagnetic and gravitational waves in the space of the Singularity confirms the dualities of this space.

3.9.6. The presence of "visible" electromagnetic waves (4D), in the transparent space of the matter of the Singularity (4D), allows for their visual observation in the three-dimensional Universe (3D).

3.9.7. The sense of sight consists in perceiving "visible" electromagnetic waves in the transparent space of the Singularity, but only those that fall directly into the eye of the observer.

3.9.8. The "visible" electromagnetic waves (4D) (400-700 nm) occurring in the space of the Singularity are detected in the eye by electrical impulses, recognized by the brain as light, creating the impression of seeing.

3.9.9. Dolphins and bats, in addition to seeing in the space of the Singularity with the help of their eyes, on a similar principle, "see" in the water space and air, with the help of hearing, "illuminating" these spaces with the ultrasounds they emit.

3.10. Deon (4D)

Deon is an electrically active spin with mass, occurring in a pair forming a Duo, as the basic element of the Singularity space at the level of the Planck magnitude (1E-35m).

3.11. Duon (4D)

Duons are formed by pairs of spins (Deons), which, depending on their relative position, determine the Duon as electromagnetically active when the spins are pointing in one direction, or inactive when the spins are directed in opposite directions.

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3.11.1. The inactive duon forms the quantum of the gravitational subspace of the Singularity (Dark Matter).

3.11.2. The active duo forms the quantum of the electromagnetic subspace of the Singularity (Ether).

3.11.3. The duo is the fundamental particle of matter of the Singularity (4D) in the form of a liquid, filling the entire Universe (3D), including its atomic matter (3D).

3.11.4. The duon possesses the mass necessary to excite a quantum, electromagnetic rotating field and transfer its energy**,** at the speed of light **c**, the energy corresponding to the physical constant M. Planck ***h.***

The mass of the Duon is calculated from the formula:

24. $EDu=mc2;$

By assuming:

25. $1EDu = 1h,$

We get:

26. $mDu = h / c2;$

The weight of the Duo is:

27. mDu = 7.372796E-50 [kg],

Where:
h=6.62606876(52)E–34 [J]; c2 = 8.9875517874E+16 [$m^2/s2$]

3.12. Duon Mass Density (4D)

28. $V_D = (\pi /6) * d_{P3}$ [m3]
    V_D = 2.2106929E-105 [m^3]
    m_{Du} = 7.372796E-50 [kg]
29. $\gamma_D = m_{Du} / V_D$ [kg/cm^3]
    γ_D = 3.3349254E+48 [kg/cm^3]

3.12.1. The mass density of Duon determines the mass density of the Singularity space.

3.13. Mass density of Singularities for packing $\rho = 0.7$

30. $\gamma_O = \rho * \gamma_D$
    γ_O = 0,7 * 3.3349254E+48
    γ_O = 2.33444778E+48 [kg/cm3]

3.14. Dark Matter ($4D_1$)

Dark Matter ($4D_1$) is the material medium of the Singularity forming the subspace of gravitational interactions ($4D_1$).

3.15. Dark Energy (4D)

Dark energy is the energy of Dark Matter.

3.16. Dark Energy (3D)

Dark Energy (3D) is the energy of Dark Matter ($4D_1$), through gravitational viscosity, acting on the atomic matter of the Universe (3D),

3.17. Gravitational viscosity

Gravitational viscosity is the gravitational interaction between the matter of the Singularity (4D) and the atomic matter immersed in it (3D).

3.18. Light (3D)

Light in 3D is a manifestation of a physical phenomenon occurring in the electromagnetic space of matter of the Singularity (4D), in the form of electromagnetic light waves (4D), falling on the retina of the eye (3D), where they are detected by electrical impulses (3D), perceived by the brain (3D) as light.

3.19. Photon (4D)

A photon (4D) is a quantum of an electromagnetic wave, in the form of a spinning electromagnetic field, created by rotating masses of spin pairs (Duos), in the electromagnetic subspace of the Singularity – the Aether ($4D_2$), having a quantum energy of field excitation, equal to Planck's constant ***h***.

3.19.1. All photons have the same quantum energy:

31. $E_P = h[J]$.

3.19.2. Photons differ in power:

32. $P_P = h*f\ [J/s]$,

where: f – the number of oscillations per second.

3.19.3. Photons (4D) do not belong to the basic system of atomic matter.

3.19.4. Photons (4D) are not particles of atomic matter (3D).

3.19.5. Photons (4D) belong to the space of Singularity (4D).

3.20. Visible photon (3D)

The visible photon (3D) is a manifestation of a quantum physical phenomenon occurring in the electromagnetic subspace of the 4D Singularity (Ether), in the form of quantum energy, equal to Planck's constant ***h***.

3.20.1. A visible (3D) photon has no mass.

3.21. Neutrino (3D)

Neutrino (3D), like the photon (3D), is a manifestation in the form of energy of a quantum physical phenomenon occurring in the gravitational space of the 4D Singularity (Dark Matter),

3.21.1. Neutrino (3D) is not a material particle

3.21.2. A neutrino (3D) has no mass.

3.21.3. A neutrino (3D) moves at the speed of light.

3.21.4. The neutrino (3D) is not a particle of the Basic System (3D).

3.21.5. Due to the similarities of the physical properties of the neutrino to those of the photon, the name of the neutrino should be changed to "Graviton".

3.22. Neutrino (4D)

The neutrino (4D) is the energy quantum of the elastic wave, the gravitational space of the 4D (Dark Matter) Singularity.

3.22.1. The neutrino moves at the speed of light.

3.22.2. The neutrino has the quantum elastic energy of the oscillating mass of the space of the Singularity (Dark Matter).

3.22.3. The neutrino interacts gravitationally.

3.22.4. The neutrino belongs to the space of Singularity (4D).

3.23. Space

Space is a material medium with a structure in which physical phenomena can occur.

3.23.1. Physical phenomena occur only in material space.

3.24. Empty space

Empty space does not constitute space

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3.24.1. Empty space has no structure.
3.24.2. Empty space does not transfer interaction.
3.24.3. Empty space does not generate any information.
3.24.4. The concept of velocity in empty space does not exist.
3.24.5. The permeability of an empty space is zero (**ε = 0**).

3.25. Material space

Material space is the material media in which physical phenomena occur.

3.26. Materiality of Space

If there is any physical quantity in any space, that space is material space.

3.27. Singularity (4D)

Singularity (4D) is an unlimited material medium, constituting the space in which all physical phenomena occur.

3.27.1. Singularity Space (4D) does not depend on time.
3.27.2. In the space of Singularity (4D) is immersed the Universe (3D).

3.28. Matter of Singularity (4D)

Matter of Singularity (4D) is a transparent quantum liquid, formed by pairs of bipolar spins, Duos (4D).

3.28.1.1. Duon parameters

Assuming that the energy of **1Du** corresponds to the energy equal to the Planck constant ***h***

size: $d_D = 1.616230E\text{-}35$ *m;*
mass: $m_{De} = 7.37249578E\text{-}50$ *kg;*
density: $\gamma_D = 3.3349254E+48$*kg/cm3*

3.28.2. Matter of Singularity (4D) is a carrier of electromagnetic and gravitational interactions (4D).

3.28.3. The occurrence of electromagnetic and gravitational waves in the Universe is a confirmation of the duality of the space of the Singularity.
3.28.4. The Matter of Singularity (4D) forms two subspaces:
3.28.4.1. Dark Matter ($4D_1$) **-** a subspace of gravitational interactions**.**
3.28.4.2. Ether (4D2) – a subspace of electromagnetic interactions**.**
3.28.5. Matter of Singularity (4D), is subject to the laws of flow.
3.28.6. Singularity (4D) does not create a static space.
3.28.7. The Space of Singularity (4D) is subject to the gravitational influence of atomic matter (3D).

3.29. Universe (3D)

The Universe of Atomic Matter is geometrically a three-dimensional 3D space.

3.29.1. The Universe of Atomic Matter (3D) arose from the matter of the space of Singularity (4D).
3.29.2. The density of matter in the Universe (3D), in the initial phase of its existence, had a density close to that of the matter of the Singularity.

3.29.3. The atomic matter of the Universe (3D) and the matter of the Singularity (4D) permeate each other.

3.30. Universe (4D)

The Universe (4D) is a three-dimensional Universe (3D), immersed in the fourth geometric dimension of the space of Singularity (4D).

3.31. Vacuum (4D)

A vacuum is a Singularity (4D) space free of atomic matter (3D).

3.32. Size of the Universe (3D)

The size of the Universe (3D) is determined by the extent of the occurrence of atomic matter (3D) in the space of Singularity (4D).

3.33. Wave

A wave is a way of transferring energy.

3.33.1. The wave is the energy of its carrier.
3.33.2. A wave has no mass
3.33.3. The wave carrier has mass.
3.33.4. The wave carrier carries the energy of the wave.
3.33.5. The wave carrier determines the speed of wave propagation.
3.33.6. There is no wave of anything.

3.34. Electromagnetic wave (4D)

An electromagnetic wave is a transverse wave (4D), caused by the movement of an electric charge (3D) in the electromagnetic space of the Singularity 4D2 (Ether).

3.34.1. The electromagnetic wave is the wave energy of the electromagnetic space of the Singularity (4D) - the Ether.

3.35. Gravitational wave

Gravitational wave is an elastic longitudinal wave (4D), caused by the motion of masses of atomic matter (3D) in the space of Singularity (4D),

3.35.1. The gravitational wave is the wave energy of the gravitational space of the Singularity (4D) - Dark Matter.

3.35.2. The motion of the masses of atomic matter (3D) in the space of the Singularity (4D) elastically modulates its space (4D), causing a gravitational wave (4D) in it.

3.36. Gravity (4D)

Gravity is the interaction of masses of atomic matter (3D) in the gravitational space of the Singularity (4D).

3.36.1. Gravity occurs only in gravitational space.

3.36.2. Gravity in 4D space, acting on an object, is the geometric sum of the effects of masses of atomic matter (3D) on that object (3D) in space (4D).

3.36.3. Gravity is a weak influence.

3.36.4. Gravitational field (4D)

The interaction of masses of atomic matter (3D) in the gravitational space of the 4D (Dark Matter) Singularity, creates a gravitational field (4D) in it.

The gravitational field (4D) elastically deforms the space of the Singularity (4D).

3.37. Electromagnetism

Electromagnetism is an interaction that takes place in the electromagnetic subspace of the Singularity (Ether).

3.37.1. Electromagnetic interaction is a conjugated, alternating electrical and magnetic interaction, transferring energy in the form of electromagnetic fields and waves.

3.37.2. Electromagnetism is a strong interaction.

3.37.3. Electricity is a primordial phenomenon in relation to the phenomenon of magnetism.

3.37.4. Electricity comes in the form of static and dynamic voltages and electric fields and currents.

3.37.5. Magnetism is a phenomenon secondary to the electrical phenomenon

3.37.6. Magnetism does not have a static state.

3.37.7. Magnetism is a response to the dynamics of an electrical phenomenon.

3.38. Electromagnetic Background (4D)

The electromagnetic background (4D) is the wave energy of the electromagnetic carrier of the Singularity – the Ether ($4D_2$).

3.39. Electromagnetic Induction

Electromagnetic induction is a way of transforming electromagnetic energy in the electromagnetic space of the Singularity (Ether).

3.40. Material Particles

Particles having mass are material.

3.40.1. Material particles are divided into: particles of atomic matter (3D) and particles of matter of Singularity (4D).
3.40.2. Material particles can have energy.
3.40.3. The velocity of material particles in space can take any value.

3.41. "Massless particles"

"Massless particles" are not particles, they are information about a physical phenomenon taking place

3.41.1. "Massless particles" move at the speed of wave propagation in space.

3.42. Time

Time is a positive scalar quantity, created by man for the purpose of chronological order of events occurring in the Universe.
There are two types of time:

3.43. Newtonian Reference Time TN (4D)

Reference time TN (4D) defined by Isaac Newton as: *"Universal and all-encompassing time, flowing at a uniform rate, being absolute and objectively uniform, throughout the Universe*".

3.43.1. The Newtonian reference time TN (4D) does not depend on space or the speed of its traversal

3.44. Einstein's Relativistic Time TE (3D)

Albert Einstein's time is the subjective passage of time, measured discreetly by a chronometer.
Einstein's relativistic time, TE (3D), depends on**:**

3.44.1. Technical parameters of the chronometer.
3.44.2. Gravity acting on the chronometer.
3.44.3. Absolute speed of the chronometer in space Curiosities (4D)

3.45. Passage of Time (3D)

The passage of time in the three-dimensional space of the Universe (3D) is a constant quantity. In the space of the Universe (3D), there is no cause for the variation of the passage of time.

3.46. Passage of Time (4D)

Time Elapse in Singularity Space (4D), depending on:

- *The absolute velocity of the Observer (3D) in 4D space.*
- *Gravity acting on the Observer (3D) in 4D space.*

3.47. Time Dilation

*Time dilation is the difference in the speed of time elapsed between the relativistic Einstein time **TE** (3D**)** and the Newtonian reference time **TN** (4D), with respect to the Newtonian time **TN** (4D).*

3.48. Time Cloning

Knowledge of time dilation and the parameters of the chronometer measuring time allows you to clone the Newtonian reference time TN (4D).

3.49. Multiverse (4D)

The Multiverse (4D) is the simultaneous occurrence of multiple Universes (3D) in the space of Singularity (4D).

3.50. Absolute Velocity in Singularity Space (4D)

The speed of propagation of light (c) is the absolute velocity in the space of Singularities (4D).

3.50.1. The existence of a definite absolute velocity in space, by equating it to it, makes it possible to determine the absolute velocities of objects in that space.
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3.51. Quantum Entanglement

Quantum entanglement is an initiated and non-separable coupling of quanta of atomic matter (3D) with Singularity Matter (4D).

The simplest examples of quantum entanglement are:
3.51.1. Electrostatic voltage**.**

3.51.2. Operation of an electrical capacitor. - Change in electrical voltage on the capacitor linings along with the square of their distance.

3.52. Currents and Vortices in Singularity Space (4D)

The liquid nature of Singularity matter (4D) means that vortices and streams (4D) can occur in its space.

3.52.1. In recent years, in galaxies, the existence of a different energy distribution than that resulting from theoretical calculations has been observed, suggesting that the Singularity space (4D), encompassing the galaxy (3D) within its range, performs a rotational motion consistent with the rotational motion of the galaxy and, through gravitational viscosity, drives the atomic matter (3D) of the galaxy.

3.53. Entropy of the Universe

The dynamics of the Universe (3D) and the dynamics of Singularity space (4D) are responsible for the entropy of the Universe (3D).

3.54. Gravitational lensing (4D)

Gravitational lensing of galaxies is caused by a change in the density of matter of the Singularity (4D) under the influence of the gravitational field created by the masses of atomic matter of the Galaxy (3D).

3.55. Spacetime

Spacetime is a concept referring to the empty space (Vacuum) of the three-dimensional Universe 3D and relativistic time. Vacuum is an empty space, in which concepts such as interaction, absolute velocity, and reference time lose physical meaning

3.56. Mathematical Theories:

Sir Roger Penrose's "Twistor Theory" and Stephen Wolfram's "Theory of Everything" suggest the existence of a fourth dimension of the Universe but see it through the prism of spacetime.

4. Final conclusions

4.1. A vacuum (Singularity) is a material space whose density determines the density of **Deon**, which is: **γ_D = 3.33492538E+48 kg/cm^3.**

4.2. The density of Duon implies that our Universe is located inside the infinite size of the Black Hole (4D).

4.3. The absolute velocity in the space of the Vacuum (Singularity) is measurable and given by the formula:

$$v = \frac{c\,\lambda_0}{4\,\lambda_i}$$

4.4. The construction of a measuring device for measuring the absolute velocity vector and the gravity vector in the space of the Singularity is feasible.

4.5. The Hafele-Keating experiment confirms that the Singularity is not an empty space.

4.6. Aether and Dark Matter are the same Singularity Matter, only with different interactions

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4.7. Dark Energy is the energy of Dark Matter, which through gravitational viscosity interacts with atomic matter.

4.8. Singularity space (4D) is not dependent on time.

4.9. Singularity space (4D) depends on the intensity of the gravitational field created by the gravitational masses of atomic matter contained within it.

4.10. I. Newton's reference time can be cloned.

4.11. The time dilation between I. Newton's reference time (4D) and A. Einstein's relativistic time is measurable.

4.12. The photon is a quantum of electromagnetic energy of the Singularity's subspace – the Aether (4D).

4.13. The neutrino is the quantum of gravitational energy of the subspace of the Singularity – Dark Matter (4D).

4.14. Gravity occurs only in gravitational space (Dark Matter).

4.15. Electromagnetic phenomena occur only in the electromagnetic space of the Singularity (Aether).

4.16. Ordering of the gravitational subspace of the Singularity (Dark Matter) (4D) creates a gravitational field (4D).

4.17. Ordering of the electromagnetic subspace of the Singularity (Aether) (4D) creates an electromagnetic field (4D).

4.18. The discovered energy distribution in galaxies, inconsistent with theoretical expectations, is caused by the influence of the rotational motion of Singularity space (4D) and its gravitational viscosity with the galaxy's matter.

4.19. Gravitational lensing of a galaxy (3D) is an effect of the densification of Singularity space (4D) by the gravitational field produced by the atomic matter masses of the galaxy (3D).

4.20. There is no direct interaction of gravitational masses (3D) on the propagation of electromagnetic waves (4D).

4.21. The entropy of the Universe (3D) is caused by the dynamics of Singularity Matter (4D) and the dynamics of the Universe's matter (3D) immersed in it.

4.22. In the Singularity space, which is in the form of a liquid, there are vortices and streams.

4.23. Higgs particles that make up atomic nuclei (3D), when released at the LHC, can pass into the matter of the Singularity (4D).

4.24. In the reverse process at the LHC, particles of matter of the Singularity (4D), within the range of the Higgs field, can be absorbed and give mass to particles of atomic matter (3D).

4.25. The "Theory of Real Physics" may become the key to making mathematical theories more realistic: Sir Roger Penrose's "Theory of Twistors" and Stephen Wolfram's "Theory of Everything".

4.26. The "Theory of Real Physics" gives meaning to the postulates of Sir Peter Higgs, from the sixties of the last century, that the influence of its divine particle extends to the entire Universe and that in its space there is a network that transmits this interaction.

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