

# *Advanced Relativity (AR)*

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## Abstract

Advanced Relativity – AR is reviewing the key concepts of Einstein’s Relativity, namely, space and time. In AR space is what we measure with roads and time is what we measure with clocks. Space is not empty and deprived of physical properties; it has its variable energy density which gives origin to energy, mass and gravity from the micro to the macro scale. Time is merely numerical order of material changes, i.e. motion running in space. AR describes all phenomena of SR and GR and opens new perspectives in cosmology and astronomy, namely, no signal can move in time as time is merely numerical order of a given signal moving in space.

Key words: space, time, Special Relativity, General Relativity, super-fluid quantum vacuum

## 1. Introduction

Advanced Relativity - **AR** is the development of Einstein’s Relativity Theory which fully integrates the observer [1] and gives curvature of space physical meaning, namely, variable energy density of space. Curvature of space is the mathematical expression of its energy density. Flat space has higher energy density than curved space [2,3]. Variable energy density of space is origin of energy, mass and gravity of elementary particles [4].

In **AR** universal space has origin in quantum vacuum time is merely numerical order of changes, i.e. motion. Linear time “past-present-future” belong the mind The Observer in physics not only causes the collapse of wave function when observing a given superposition, but also, when measuring a given physical phenomenon, defines duration as “emergent time”. Until measured, time exists only as a fundamental time, which is the numerical order of material changes running in space [5]. In space is always NOW [6]. In **AR** time is not 4<sup>th</sup> physical dimension of space, time is merely mathematical parameter of changes which run in space. In **AR** it is not time that is relative, which is the common interpretation of Einstein’s Relativity, which is wrong. Time as numerical order of changes in space cannot be relative; relative is velocity of changes which depends on energy density of space. Less dense is space, lower is velocity of changes [7].

The Special Relativity can be described in a 3D Euclidean space. According to the 3D interpretation of special relativity - which can explain in a consistent way several relativistic phenomena, such as the aberration of light, the Doppler effect, Jupiter’s satellite’s occultation and radar ranging of the planets – Einstein’s formalism of special relativity based on the standard Lorentz transformations may be derived from a more fundamental 3D

Euclidean space, with Galilean transformations for the three spatial dimensions and Selleri's transformation for the rate of clocks [8].

In **AR** light is not bending because space is curved. Light is bending because photon has a mass which is attracted by the gravity of stellar objects. Curvature of space in **GR** is the mathematical description of its variable energy density. Universal space itself is "flat" – Euclidean confirms NASA research [9].

## 2. Advanced Relativity is without length contraction and without time dilatation

In **AR** we do not have "length contraction" and we do not have "time dilatation". Length contraction was "invented" by George FitzGerald and Hendrik Lorentz to explain the negative outcome of the Michelson-Morley experiment and to rescue the hypothesis of the stationary ether. The fact is that MM experiment has given null result because ether around the Earth is moving with the Earth and is also rotating with the Earth. We call that "dragging affect" [3].

When at the beginning of 20<sup>th</sup> century ether was abolished from physics Einstein has then proposed the idea that photon can move in an empty space deprived of physical properties. This discovery has caused big theoretical problem, namely, at that time it was observed that light has the same speed independently an observer move from the source or it moves towards the source. Considering that photon and the observer move in an empty space Galilean transformation was not able to describe constancy of light. If the model of photon as the wave of ether would not be abolished, Galilean transformation would be suitable, namely, the source of light and all inertial systems are moving in ether where photon is the wave of ether. Photon has the same velocity in all inertial systems because photon is the wave of the medium in which all inertial systems move. Light is obeying Doppler effect.

Einstein has taken much more complicated way, namely, constancy of light as a postulate which was not necessary because constancy of light was already measured. In order to describe electromagnetism in an empty space he has used Lorentz transformation and Minkowski manifold. The idea of the "length" contraction" was preserved in this model. The problem is that length contraction in SR is valid only for the observer "at rest" and is not valid for the moving observer. How this is possible no one can explain in today physics. Length contraction of SR is illogical. We do not have in physics a single plausible physical explanation why the length is different for rest observer than for the moving observer. It is time to abandon length contraction from physics and accept that photon is the vibration of ether, which in today physics has new name; we call it "super fluid quantum vacuum".

Considering that photon is the wave of the medium in which all inertial systems move **SR** can be described in a 3D Euclidean space with Galilean transformation for X, Y and Z and Selleri transformation for time t; without "length contraction", "time dilatation" and "time coordinate" [8]. In **AR** it is not time that is relative, relative is velocity of material changes which we measure with clocks. Clocks run in quantum vacuum only, not in time. Time is merely numerical order of changes which run in quantum vacuum where is always NOW [10]. **GPS** proves that relative velocity of clocks because of **SR** and **GR** effect are valid for all

observers. "Rest observer" and "moving observer" should be abolished because they do not have real existence; they are only theoretical unproved prepositions which are irrational.

Shapiro experiment is interpreted in today physics as a "gravitational time dilatation" which is wrong. The measured fact is that light has minimally smaller speed in strong gravity. Stronger is gravity, lower is density of quantum vacuum, which is changing its permittivity and permeability which causes minimal change of light velocity [3]. In today physics is not allowed even to think that light speed might have in some special cases minimal variations, which is not reasonable. Infinitesimal small variations of light speed are not calling into question validity of Einstein's Relativity which remains the ground stone of physics and needs only to be renewed in some minimal details.

One of these details is that space-time is the wrong term, because space-time where time is 4<sup>th</sup> dimension of space does not exist in physical reality. Space we measure with rods and time we measure with clocks. Time cannot dilate and space cannot shrink. These are only mathematical tricks of Einstein in order to solve the problem of constancy of light speed in an empty space. **AR** is solving the constancy of light speed in a much more elegant and non-ambiguous way which is valid for all observers.

**AR** model of dynamic quantum vacuum describes mathematically in details planets precession where quantum vacuum has a dragging effect because of Sun motion. Our results on precession are on the second the same as of Einstein. Also Sagnac effect is described in details by the dragging effect of rotating interferometer [3].

As Einstein has kept length contraction in **SR** he also has introduced it **GR** which is another mathematical trick of Einstein never observed and measured. On gravitational length contraction is based length variation of beams by LIGO interferometer which also was not measured directly. The only plausible explanation of LIGO results, namely, variable time of laser motion inside the beams is that GW is changing energy density of quantum vacuum and so its permittivity and permeability which changes minimally light speed [4]. In **AR** gravitational waves are areas of variable energy density of quantum vacuum.

**3. Advanced Relativity unifies General Relativity (GR) and Quantum Mechanics (QM)**

In **AR** elementary particles and stellar objects both move in space only and not in time. Time is merely numerical order of their motion. Every particle, massive body and stellar object diminishes energy density of space in correspondence to the amount of its energy. Diminished energy density of space is the origin of mass and gravity from the micro to the macro scale. ....

**4. Advanced Relativity combine entropy and syntropy**

In **AR** entropy is valid only for material objects. Space in which material objects exist has no entropy. Matter is entropic state of primordial energy of space which itself is syntropic. In living organisms the syntropic energy of space is the physical basis for negative entropy (negentropy) of living organism.....

## 5. In Advanced Relativity the model of consciousness which is the origin of the observer is n-dimensional Hilbert space

**AR** is based on experimental data, namely NASA results confirms universal space is “flat”. This means universal space has Euclidean shape and is not “finite”, but it is infinite. From mathematics we know that “infinite distance + 1000km is still infinite distance. Infinity in mathematics and physics is not a metrical term. Infinity of universal space we cannot fully comprehend by the rational mind, we can experience it in meditation. For millenniums spiritual researchers have experience of “infinite spaciousness” when meditating on the subject of human real nature - consciousness. Buddhists use term “Emptiness”, “Nothingness”, “Shunyata, Taoist use term “Tao”. **AR** is enlarging reductionist approach of physics that only the phenomena exist which can be measured with integral approach which confirms that also what can be experienced (without being measured) is real. Consciousness which is the origin of the observer is real and can be described as n-dimensional Hilbert space (where  $n$  is cardinal number of natural numbers). In physics we observe photon in a 3D material world. When frequency of the 3D photon is increasing to the infinite value, it is also entering higher dimensions of Hilbert spaces. Finally in n-dimensional Hilbert space energy of the photons is transformed into energy of consciousness.

In **AR** photon is the wave of universal space named also “3D quantum vacuum” or “3D physical vacuum”. In quantum mechanics energy of the photon is:

$$E = n \cdot h \cdot \nu ,$$

where  $h$  is the Planck constant and  $\nu$  is the photon frequency,  $n$  is integer (1,2,3...). Consciousness is described as the photon which has infinite frequency and exists in n-dimensional Hilbert space:

$$\lim_{\nu \rightarrow \infty, n \rightarrow \infty} n \cdot h \cdot \nu = \text{consciousness} .$$

In the formula above integer  $n$  represents the dimensionality of Hilbert spaces. When vibration  $\nu$  becomes infinite, integer  $n$  becomes cardinal number of natural numbers. Consciousness is the vibration of n-dimensional Hilbert space which limit is tending to the infinite value of frequency and zero value of the wave length  $\lambda$  . Out of that follows velocity  $v$  of consciousness is zero:

$$v = \nu \cdot \lambda = 0$$

This mathematical model is not real picture of the consciousness; it only indicates its real nature. Consciousness is beyond logic and so beyond mathematics which can only help us to build an approximate model. Mathematics cannot explain the physical reality of the universe; it can only describe it with its limitations.

Consciousness does not move in space, consciousness is the fundamental vibration of space. When vibration of consciousness is getting lower it transforms into the light. Consciousness acts via bio-photons on the microtubules of the brain [1]. Information flow from the consciousness to the 3 dimensional living matter which is composing living

organisms is running from the  $n$  dimensional Hilbert space via less dimensional Hilbert spaces until is arriving to the 3 dimensional matter. Each “information jump” on the space with lower number is accompanied with the lower energy of the “photon” accordingly to the following formula:

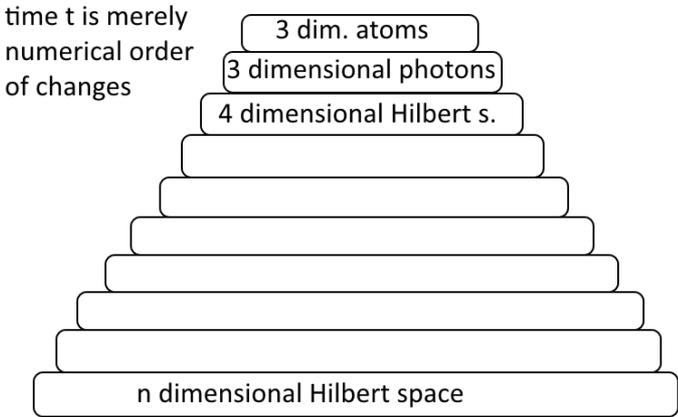
$$E = n \cdot h \cdot \nu,$$

where  $n$  is an integer (1, 2, 3, ...),  $h$  is Planck's constant, and  $\nu$  is the frequency. In formula above we can see Planck constant is the constant which bridges different Hilbert spaces.

Our standard scientific view that the vibration can exist only in a 3D reality is now upgraded with the understanding that also higher dimension are existent and that they have their own vibrations. Planck constant is the constant connecting these n-dimensional vibrations.

Photon observed in a 3D world is connected with the consciousness via Hilbert spaces. That’s why bio-photons discovered by Russian physicists Alexander Gurwitsch Gurjijef and German physicists Albert Fritz Popp are of the immense importance. Bio-photons are an “information bridge” between atom level and high dimensional Hilbert spaces. Information which flows from the higher Hilbert spaces to the lower Hilbert spaces is designing not only functioning of the single living organism, but also entire evolution of life which is developing in entire universe.

From the formalism  $E = n \cdot h \cdot \nu$  we can see that energy of primordial consciousness in n-dimensional Hilbert space has infinite energy. This “infinite energy” is spiritual energy, the energy of the pure Spirit-Consciousness. 3D world exists within this pool of infinite Spirit-Consciousness energy. With descending in lower Hilbert spaces this spiritual energy is becoming more and more “structured” and “dense” and appears in a 3D world as the photon. Recent discoveries confirm matter is made out of photons [11], which mean that matter is consciousness in its most dense form.



**Figure 1:** AR structure of the universe where photon is the wave of a 3D quantum vacuum and time has merely mathematical existence

## 6. N-dimensional Hilbert spaces and De Broglie pilot wave model

Advanced Relativity (AR) is development of De Broglie pilot wave model. Every elementary particle in a 3D universal physical space has its pilot waves in higher dimensional Hilbert spaces. Consciousness is the higher Hilbert space and is “guiding” via lower dimensional spaces 3D elementary particles.

## 7. Conclusions

Vital force of physics is constant re-examination about the validity fundamental principles of physics. The principle of space-time as a fundamental arena of the universe has no experimental verification and after 100 years of use did not contribute to the advance of physics. In equations of SR and GR and in physics in generally symbol for time  $t$  means duration of changes running in space. Experimental data show that space and time are two different principles. Advanced Relativity is taking this in account. The result is renewed Relativity Theory which has turned from mathematical theory to physical theory where variable energy of space is the driving force of physical world on the micro and macro scale.

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