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NEW GEOMETRY IN THE QUANTIC SPACE-TIME OF EVTD2 THEORY: THE PYTHAGOREAN THEOREM IS NO MORE VALUABLE

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Abstract: *This work extends publications [1, 2] which, in the framework of a fully quantum space-time, initiates by necessity indeed, a new geometry, different of the Euclidean one. The infinitely small mathematical point is unrealistic in Physics (where is the study of concrete), here it is replaced by a nonbreaking quantum volume of an EVTD^2 entity. The demonstration of a new theorem relating to the triangle is done, and this puts in difficulty the Pythagorean Theorem making it obsolete and unusable. The EVTD^2 theorem particularly favors the correlation of space with time, by light speed. The propagation of light is subject to questions [1, 9] in this quantum space-time.* ***Key words:*** *quantic geometry, RVTD^2 theorem, substratum (quanta ether), EVTD^2 theory.*

1. INTRODUCTION

This study is a logic extension of previous [1, 2], already published in this journal. It is also a space-time defined in the theory of joined EVTD^2 entities [3-8] forming a framework where, in fact, will be developed formatting tests for the new related geometry. This must be intrinsic to this entirely quantic space –time. But more will be developed the manner of considering the duration or the time (i.e. the corresponding sum of quantified time duration) for an electromagnetic wave, between two considered spatial zones EVTD^2.

So will be highlighted *the respective relations of spatial dimensions and time which also* ***must be correlated with each other in a space-time worthy of the name****.*

And for this specific correlation, what is better than the speed relationship that connects quite simply, in a simple relationship, the dimensional value of travelled length reported to in his time along this length?

Most importantly, *is to consider the light speed* because that responds, in this case, very well to the problem, and *it is unavoidable*. Indeed, it is an absolute reference value by the virtue of its constant value in the vacuum of condensed matter.

The EVTD^2 entities theory and this new geometry perfectly reveal the why of this. So, *AB* is here, for example, in this new geometry, bounded by the two extreme EVTD^2 volumes of this length, respectively referred to as *A* and *B*. Thus ends *A* and *B* are expected to play, to their ways, the roles of Euclidean geometrical conventional points materializing this length, specially delimited, between these two geometric marks intrinsic to this space-time.

The latter is fully quantic in time and in space and the EVTD^2 cubes, real *Atomos* of Democritus, are therefore nonbreaking in space and in time [3-8].

The general structure in these cubes forming the space-time, is subject to the vibration of the EMW (electromagnetic mother wave) at very high frequency (that of Planck) which maintains the same alternating phase state inside them [3-8]. It follows therefore, a quantum of this three-dimensional structure format and, in fact, a vibration sorting solicitation is generated by 'pushed' and 'learned' to the magnitudes of spreading longitudinal itself wave OME and similarly respectively electric and magnetic vectors.

Therefore, it follows a quantum formatting of this three-dimensional structure and, in fact, a vibration solicitation is generated by 'pushed' and 'pull' of the longitudinal EMW waves amplitude, and similarly respective, electric and magnetic vectors. This brings up, in these $EVTD^2$ volumes, quanta of very strong energies resulting from space substrate vibration. This latter is referred to as ***Substratum*** *that, for its positive and negative pressures, is assimilated respectively to dark matter and dark energy* being the primary substrate for this quantum space-time in scalable densities in the vicinity of masses. But, in little areas or, more, in areas long away from any mass, the *Substratum* density is relatively uniform.

The new so-called $EVTD^2$ geometry will therefore have to take account the specific characteristics of this new physics that can be named $EVTD^2$. Thus, the two Euclidean points that define a geometric classic length will be replaced by the two extreme $EVTD^2$, of the length to be considered, each of which contains the corresponding Euclidean point, but also, a multitude of other Euclidean points in phase, thus defining the quantified volume $EVTD^2$ (which cannot be infinitely small as *physically unrealistic Euclidean point,* in this case) of each ends *A* and *B*.

Therefore the end *A* as Euclidean point, for example for the length *AB*, is not precisely known but somewhere in the volume of the $EVTD^2$ in question. Similarly for the Euclidean point *B* contained within the $EVTD^2$ entity placed at the other end.

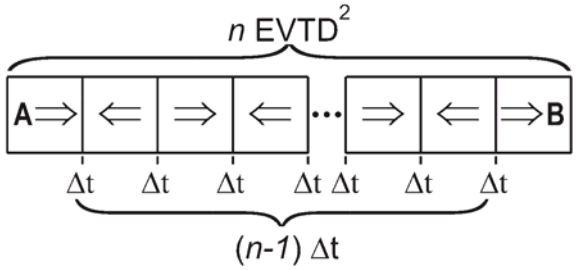

Fig. 1. Representation of an *AB* length and its time quanta Δt, bounded by extreme $EVTD^2$, *A* and *B*. *AB* is simply, here, a linear rope consisting of a sequence of identical entities.

So in geometry of $EVTD^2$ entities physics, a number *n* represents the sum of the quantum components $EVTD^2$ located along a length *AB* (shown in figure 1, simply by a mono linear $EVTD^2$ rope) formed by joint $EVTD^2$ volumes. So the rope - length is materialized in quantum geometric elements of identical sizes (for relatively small dimensions).

Thus we can write, quite simply, the representation of this length by its constituent number of entities in $EVTD^2$ unit, as:

$$\text{Length } AB = n \cdot EVTD^2. \qquad (1)$$

In theory $EVTD^2$ the light travels distances in instantaneous speed but its propagation is interrupted by many stop (pause) laps of time, which compose its journey duration [9]. With regard to time, in this case the duration of light journey along *AB*, it will be able to be determined very easily. Indeed, if we call Δt the time of light stop between two joined $EVTD^2$ alternations or, what corresponds primary to the time between two EMW alternations (or a half period) that formats these various $EVTD^2$ entities, then the movement duration of the light will be the sum of all existing Δt in this $EVTD^2$ suite.

The order of magnitude of a Δt generally corresponds to the value of the Planck half-time, i.e. to: 2.6953 10^{-44} s. *This amount of time quantum Δt will also match to the number intervals existing between the n* $EVTD^2$ elements of the *AB* length.

To get this number of intervals, and thus of Δt, it is necessary to subtract one unit of constituting elements number belonging to this entities suite, because there is one less than the elements in a suite, where from:

$$\textit{Travel duration} = (n-1)\cdot \Delta t\,. \qquad (2)$$

So, we can hope that this new quantum space-time geometry, especially useful in the very small spatial dimensions, won't be of the very great complexity. Indeed, this $EVTD^2$ space-time is fully quantified but also fully structured by the high energy electromagnetism, EMW in this case.

What makes that communication, of different $EVTD^2$ areas, is largely governed by electromagnetic waves well correlated to this

space: so the speed of light is surely the unifying principle in such a space-time.

2. NEW RIGHT TRIANGLE THEOREM IN THE EVTD^2 QUANTUM SPACE-TIME: THAT OF PYTHAGORAS IS OBSOLETE

To analyze this new geometry, beyond the simplistic case above (figure 1), it is then necessary to solve the problem of relating the time and the spatial dimension of length which is no longer a linear EVTD^2 string. In this new study case, still simplified, *AB* length will bias relative to the uniform structure in the EVTD^2 space-time, this being represented by the diagram in figure 2.

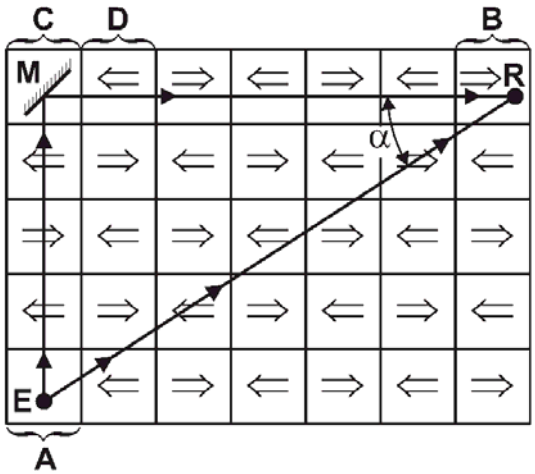

Fig. 2. Representation of the two trajectories of a laser beam in an *ACDB* triangle with the sides of the right angle respectively aligned on both directions of the system EVTD2 of space-time.

The spatial position of the limits *A* and *B* of the considered *AB* length are usually known but it is, also, imperative to know one direction of the EVTD^2 that structure the space along and around *AB*.

Let us suppose that the α angle between *AB* and direction of EVTD^2 cubes is known. From there, it is easy to correctly structure this effective organization in EVTD^2 along and around *AB*, as shown in figure 2.

With these information it will be possible to define the arising new geometry - distinctive feature of the triangle, having to one side of the right angle the linear EVTD^2 string *AC* and, on the other side another linear EVTD^2 string bounded by the *D* and *B* entities.

The hypotenuse of the right triangle will, of course, be the length *AB*, diagonally in the suites of EVTD^2, following the figure 2. It is to be noted that it is not about to use also the EVTD^2 referenced *C* as beginning of the other side the right corner who was appointed more wisely by the *DB* length.

Indeed, here unlike Euclidean geometry, it is not suitable to use the same EVTD^2 to confine one and other end of two joined lengths: these bounds are quantum of concrete size and are not infinitely reduced as the Euclidean point.

Therefore, concerning the example of figure 2, the *AC*, linear length in EVTD^2, is composed, here, of 5 EVTD^2, while the linear length *DB* contains, 6 joined EVTD^2 to *C* entity, being here perpendicular to the orientation of the linear length *AC*. Whereas with regard to the length of the hypotenuse *AB,* it has been materialized by a certain line joining particular Euclidean points among those who occupy the volumes of entities *A* and *B*. Following the path of this narrow *AB* line through the canvas of entities we count that it passes through eleven (11) different EVTD^2.

Taking into account different narrow lines starting in *A* and arriving in *B,* the same count of eleven (11) EVTD^2 will be crossed. From here, we will think through a thought experiment which is simply represented by figure 2.

A sufficiently fine and pulsed laser beam, which is separated in *A* following both directions, respectively aligned on *AC* and *AB* is used. Over there, in *A* is a sufficiently small (E) device that allows to give time to transition from flash laser respectively on the two trajectories *AC* and *AB*.

In the entity *B,* a receiver (R) gives the arrival time of the flash when it comes from, respectively, on the one hand following the *AB* direction and on the other hand, following the path *ACDB*. Indeed in the entity *C* is located a tiny mirror (M) who reflects the laser beam from *A* to the entity *B* through *D*, Fig. 2.

Always in the EVTD^2 entities physics and inside its impact on the mode of propagation and the speed of light, recalled earlier [9], the spatial circumstances and then the results, on time, on the two routes that come to be

described on the triangle *ACDB* will be studied, and the respective circumstances faced by both beams laser on two specific trajectories will be described.

2.1. Possible situations along ACDB

In the *AC* segment of trajectory, till mirror *C*, the laser beam pass through five EVTD^2. For this it will cross four time intervals each of *Δt,* wherefrom a time of four *Δt* to pass through *AC*. After reflection on the mirror *C*, the beam will pass along *CBD* but, in EVTD^2 physics, as it touched *C*, it will be instantly delivered to the interval between *C* and *D* (instantaneous speed) and then it will be in its corresponding waiting time *Δt*. The last duration of the displacement till *B* to be considered, counts 6 new intervals between the EVTD^2 which causes a displacement duration increase of 6 *Δt*. With regard to the number of crossed EVTD^2 as to get to B, it counts since and including *D*, six additional entities.

Ultimately, the overall number of crossed EVTD^2 on this *ACDB* trajectory is *5+6 = 11 EVTD^2*.

The overall duration of the beam on ACDB trajectory will be equal to the sum *4 Δt + 6 Δt = 10 Δt*.

2.2. Possible situations along AB

It was earlier reported that there were eleven traversed EVTD^2 entities along the length of the hypotenuse *AB*, by the laser beam. Detailing this trajectory represented in figure 2 we count, on the other hand, there are *ten necessary time intervals Δt* for the laser beam to arrive from *A to B* by the path of hypotenuse.

So, as for the other trajectory following the right angle sides, one can count for items (length elements traversed at the instantaneous speed and time intervals) - *crossed space-time elements: 11 EVTD^2 and 10 Δt*.

2.3. Analyze and the new theorem of the right triangle in the quantified space-time EVTD^2

It is thus apparent, in the context of the theory of EVTD^2 entities, in the triangle in Fig. 2, but also in all triangles in different formats (this is true), a perfect analogy between spatial and temporal circumstances materializing on the two trajectories *ACDB* (continued from the sides of the right angle) and the hypotenuse AB.

It is perhaps not superfluous to clarify again that the length of the beam path inside an EVTD^2 entity has no significance as its dimension itself, because the course is carried out at instant speed. What counts more is the number of crossed EVTD^2 because it induces, directly, the number of intervals *Δt* (separations) that, by their sum, will determine the specific duration of the considered displacement.

Thus, if the side *AC* of rectangular angle is called *a,* as a result of what comes to be recalled, the number of EVTD^2 on *AC* can be noted as equal to *a,* and by prolongation, *AB=a* can be assimilated. By analogy, the other side of right angle can be noted: *DB=b.* Finally, the hypotenuse *AB* will be denominated by the number of EVTD^2 entities *h* and, *DB=h*.

As a result of this study, can be proposed a new theorem in regard to the dimensional and temporal elements in the right triangle that checks the following equalities.

For EVTD^2 entities number:

$$a + b = h = 11\,. \tag{3}$$

More, for the light propagation duration:

$$a + b = \text{time } h = 10\Delta t\,. \tag{4}$$

Therefore, the new theorem of the right triangle in a quantum space-time EVTD^2 is ***simply written in EVTD^2 number and also in time*** (***duration of the beam propagation***). It highlights that these two parameters are respectively identical on and through the hypotenuse on one hand, and the on the second, on and in the sum of the other two sides (sides of the right angle).

So, unlike the Pythagorean Theorem in Euclidean geometry, here dimensions, are not considered in their square. But moreover, in the fully quantum space-time, there is too, a perfect equality and correlation between the time of *A* and that of *B*. This is settled following the light trajectories: along the hypotenuse or along the sum of the other two sides.

In other words, a signal send from the entity *A* to B, by an electromagnetic wave following any path – through the hypotenuse or through the two sides of the right angle - will have the same time of propagation. These results, intrinsic to this type of triangles included in an $EVTD^2$ space-time, can be summarized in the following theorem:

In a right triangle, which both sides of the right angle are, respectively, two $EVTD^2$ suites strings – linear and the hypotenuse is a suite of joined $EVTD^2$ bias in the quantum spatial - temporal structure $EVTD^2$, ***the exchanges of electromagnetic signals propagated respectively on AB (hypotenuse) and by the trajectory consisting of both sides (ACDB) are perfectly synchronous****. Thus these two spatial – temporal values are strictly equivalent what gives, respectively, in quantum $EVTD^2$ dimension and time the equality:*

$$\textbf{\textit{Hypotenuse}}_{EVTD^2,t} = \textbf{\textit{first side of right angle}}_{EVTD^2,t} + \textbf{\textit{second side of right angle}}_{EVTD^2,t}. \quad (5)$$

3. POTENTIAL VERIFICATION OF THIS THEOREM IN A QUANTUM SPACE-TIME THAT COULD ALSO GRANTING THE EVTD² THEORY

It is obvious that the experience of thought (for a simplified understanding) in accordance with figure 2 is not feasible (the dimensions are too small). If possible, it should consider practice and take into account, while remaining in compliance, dimensions of a right triangle that are so excessively large.

This could hopefully consider the establishment of this experience in the space surrounding earth and including satellites, for example geostationary, which would include *C* and *B* tips. The tip *A*, positioned on Earth, vertical to C, would be the timer and operative transmitter of laser flashes in the direction of the satellites *C* and *B* what is schematized in figure 3. *C* satellite would include the mirror which orientation would allow the reflection of the flash received from *A* to the *B* satellite. The latter would be equipped with receivers and timers or a suitable system of interference of a same flash separated to transit through two paths: *AB* and *ACDB*.

So the most important thing to verify, i.e. equal two times on the two possible paths of this triangle, could be experimentally checked.

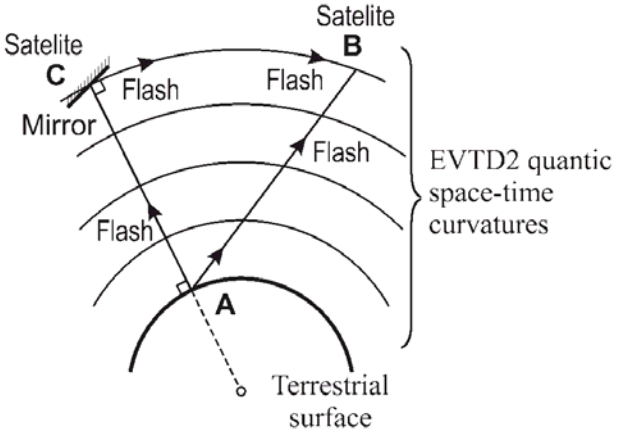

Fig. 3. Experience by satellites to validate the new theorem in quantum geometry: equal travel times on the two paths in a right triangle. In *A*, on Earth, the flashes transmitter and timer and in *B* receiver - timer. The quantum space-time is curved.

If this theorem is checked someday, it will be just enough to know the EVTD2 field orientation in order to construct the adapted triangle from the length in question. The latter will play the role of the hypotenuse, along which we want to determine the duration of course of electromagnetic waves and also the number of crossed $EVTD^2$. For these determinations, is to simply apply with more convenience, to the situations encountered on the journey formed by subsequently joined suite on both sides of the right angle of the triangle.

4. CONCLUSION

The new geometry on the basis of a quantum space-time EVTD2 is full of promise, but she asked a different formatting in comparison with the Euclidean geometry (point infinitely small) which cannot realize a space-time fully quantified in real Athomos.

The new theorem, in quantum geometry $EVTD^2$, relating to the right triangle is quite different from that of Pythagoras as there is, here, a perfect correlation between the space and the time. The real osmosis that occurs

between the numbers of crossed $EVTD^2$ and the light journey times from one $EVTD^2$ to another (ends of the hypotenuse) by the two mentioned paths, allows to perfectly connect quantum $EVTD^2$ dimensions, mainly by their number (because inside of these the light speed is instantaneous) and time (duration) in the light propagation.

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O nouă geometrie în spaţiul cuantic al teoriei EVTD2: teorema lui Pitagora nu mai este validă

Rezumat: Prezenta lucrare extinde articolele precedente [1, 2], în care, în contextual unui spaţiu-timp integral cuantificat, se iniţiază necesitatea unei noi geometrii, diferită de cea euclidiană. Punctul matematic infinit mic care nu este realistic în fizică (în care studiul se adresează concretului) este înlocuit aici de un volum cuantic, non separabil, al unei entităţi $EVTD^2$. Este prezentată p tentativă de demonstraţie a unei noi teoreme, relativ la triunghiul dreptunghic, ceea ce pune în dificultate teorema lui Pitagora, dovedind-o depăşită şi neutilizabilă. Teorema în spaţiul EVTD2, promovează în mod particular corelaţia dintre spaţiu şi timp prin viteza luminii. Propagarea luminii este analizată [1, 9] în acest spaţiu – timp.

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