



SUBSTRATUM OF EVTD2 QUANTIC SPACE TIME, THE ELEMENT OF DARK MATTER AND DARK ENERGY

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ABSTRACT

The interactions in gravity and in classical electrostatics have been revisited in (Conte, 2015, 2017) and it follows from this the taking into account of the temperatures in black body equilibrium for the neutral and charged masses thus involving two new and different writings of the relations of the resulting respective forces. This new conception of the effects of black body radiations in photonic fields which are superimposed in the structure of space-time in quantum entities EVTD² requires that inside the entities exist material elements (concretizing the substrate of space-time) to capture and store these electromagnetic energies and they were originally named *Substratum*. From an electrical point of view, this Substratum corpuscle would be a dipole of very small dimensions internal to the EVTD² and its spatial orientations would be correlated with the positive and negative pressures where the attractive and repulsive effects are generated in the new conceptions of gravity and electrostatics.

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INTRODUCTION

It will be here about the elements or of the single element which would occupy space-time in its smallest dimensions (almost tiny for our dimensions) and it is therefore necessary that this substrate of space be something concrete and real (a certain material substance) because it is necessary that even the energy has a material support - the real does not exist in nothingness. The name Substratum has been adopted to characterize this surely unique component (simplicity obliges) of the excessively small space of EVTD² entities in the basic volumes of this fully quantum all space-time theory (dimensions and time). In addition, this basic Substratum must not emit photonic radiations into space because there is no finding in this direction: it is then possible to make its connection with what is currently called in Physics the dark matter and dark energy. First, it will be necessary to try to elucidate this question on the very nature of this material element which is very small in size to fit into the dimensions of the volumes of very small EVTD² entities (about Planck's length).

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Then, it will be this other question of knowing what is its role, if possible physically acceptable in this fully quantified space, in particular in relation to, on the one hand, gravity and, on the other hand, the electrostatic behavior of electric charges. Within the framework of this new Physics EVTD², a certain number of publications have proposed new ideas concerning the principles of physical phenomena which would make possible to understand how the gravitational approaches and distances (Conte, 2015; Roșca, 2017) really work between two electrically neutral masses but also the attractions and repulsions that exist between electrically charged bodies. Knowing that within the framework of the new Physics EVTD² the entire base of the Universe is electromagnetic structured, it is therefore not inappropriate to design for the corresponding explanations to use and also integrate electromagnetic physics principles. This in the understanding and perhaps even in the realism of these phenomena which still remain in the state of enigmas. The plausible explanations, in EVTD², already proposed argued that both gravity and electrostatics only initially and occasionally took into account masses and charges with their intrinsic characteristics, and closings or repulsions were only organized around bodies and especially at the levels of their zones of zero resulting potentials where, for example, the behaviors are similar to

those of mini black holes in action and would cause the respective approaches. As for the electrostatic repulsion of bodies charged with the same polarity, the acting physical phenomena are active in the surrounding areas of the bodies. It follows that their specific and therefore particular behaviors, in the intercalary space, **would be analogous to those of many white holes in relatively very large areas compared to the small areas occupied by the mini black holes for attraction.** These multiple white holes would be, as is already imaged, analogous to gushing fountains and in the EVTD² theory they would be adapted numbers of Substratum elements which, potentially or actually would *spring from their previous zones while being under the influence of a negative pressure, which is quite similar to dark energy* according to the current name. In many works (Conte, 2017; Conte, 2017) it has been shown that one could write the relations of Newton and Coulomb by replacing respectively the values of the masses and the electric charges by their equivalent temperatures black bodies of the surfaces of the considered bodies. These new relations are written respectively F_{GEL} for the force in gravity (Conte, 2017) and for the electrostatic force F_{QEL} (3) according to the expressions:

$$F_{GEL12} = C_{GEL} \cdot \frac{T_{e1}^4 \cdot T_{e2}^4}{d^2} = 1,37574 \cdot 10^{20} \cdot \frac{(T_{e1} \cdot T_{e2})^4}{d^2}, \text{ with}$$

$$C_{GEL} = 1,37574 \cdot 10^{20} \text{ N} \cdot \text{m}^2 \cdot \text{K}^{-8};$$

$$F_{QELAB} = D_{QEL} \cdot \frac{T_{eA}^4 \cdot T_{eB}^4}{d^2} = 4,8721615866 \cdot 10^{-16} \cdot \frac{(T_{eA} \cdot T_{eB})^4}{d^2},$$

$$\text{with } D_{QEL} = 4,8721615866 \cdot 10^{-16} \text{ N} \cdot \text{m}^2 \cdot \text{K}^{-8}.$$

These new expressions of the gravity and electrostatics forces are similar in the parameters taken into account (T_e^4 and d^2), while those of Newton and Coulomb were found to be only similar. Because of this strong progressiveness of analogy there is then no doubt that these two manifestations of forces, for the two identities of the respective bodies (globally in the neutral state or electrically charged), derive from the same basic physical principles which can only be of photonic origin equivalent to black bodies of their surfaces. Indeed, these photonic radiations can propagate to infinity from each body (neutral or charged), in particular towards and up to the one opposite placed. In addition, the electrostatic interaction is recognized today as carried by the photon, so, following this consideration, the energy of electromagnetic waves is involved, too, in this interaction between electrified bodies. In fact, the additional charges are preferentially localized almost on the surface of the bodies and they have movements which automatically generate electromagnetic waves (photons) which are superimposed on those given by the atoms of the mass bodies carrying charges: these additions of photons therefore constitute global surface emittances correlated with the respective black body equilibrium temperatures T_e . The determination of the overall black body equilibrium temperature of the mass body charged with a certain charge must take into account, on the one hand, the equilibrium temperature of the body at its temperature itself and, on the other hand, this that the charge considered placed under the surface of the body contributes in black body equilibrium temperature equivalent. But it should be noted that the increase in this part of equilibrium temperature is not linear with the growth of the electric charge. In fact, the more the charge increases, the more the carrying charge elements of the same

polarity repel each other more and more from its surface towards the interior of the mass body. Thus the photons generated by these innermost electrical elements are more and more absorbed by the material to be crossed (increasing absorbing paths) to arrive at being emitted outside the body: *hence a non-linear decrease in equilibrium temperature supply for a regular increase in the overall electrical charge.*

NATURE OF THE SUBSTRATUM AND ITS ROLE IN THE RESPECTIVE PHOTONIC ACTIVE PHENOMENA GRAVITY AND ELECTROSTATIC

Proposals on an adapted nature of the Substratum

The nature and material configuration of the Substratum element require particular compliance requirements so as not to generate electromagnetic emissions outside this element (this is a finding for spatial areas without visible condensed matter): *it could therefore be the main constituent of dark matter and dark energy.* This does not automatically impose that there are no elaborations of photons inside the Substratum itself but these photons must be, then, equivalent in amplitude and also of opposite coherent phases in order to annihilate each other immediately after their generations in the internal and very reduced space of this element of very small dimensions. Indeed it is hardly conceivable that in a structured Universe with an entirely quantum and electromagnetic EVTD2 space-time the smallest element, which more is in very numerous quantity, does not also have electromagnetism as configuration and basic nature. So in keeping with the simplicity of such an internal organization, thus assumed, it is necessary that the number of electric charges of the element be half respectively of opposite polarities (+, -) and of the same absolute value. But in addition the internal movements of each of these preponderant charges must be synchronous and identical to each other to thus generate electromagnetic waves (photons) of equal amplitudes but of opposite coherent phases. From this structuring of the Substratum, previously assumed, there are indeed electromagnetic waves created inside the element but none are emitted outside because they mutually annihilate each other in situ. So still in simplicity it is *conceivable to provide such an electric dipole for the Substratum and this gives, moreover, electric neutrality* which is very interesting for an element constituting the base of the substrate of all universal space-time. It can thus be associated with all the other neutral or charged elements of condensed matter without having major influences on its part (required by the neutrality). By continuing the reasoning relating to the fact that there would be inside the Substratum dipole element two coherent electromagnetic waves of the same amplitude but of opposite phases emitted simultaneously, we are led, in the EVTD² theory, to reflect on the whole process physical which would allow this external neutrality of appearance while what is generated is confined inside the element. The first thing is to recommend that the Substratum is of a small enough size to be easily contained in the volume of an EVTD² entity: thus this bipolar element is under the influence of each of the alternating phases of the EMW - Electromagnetic Mother Wave which permanently formats space-time in volume quanta (EVTD² entities). Moreover this di pole (in a stable zone) will have the two opposite charges which will therefore be oriented with respect to the direction (stable in this zone) of the electric vector of the EMW from where identical organization for all the "bipolar Substrata rods" well defined and relatively stable under the right conditions.

As it is, at each phase undergone by the entity (host of the dipoles) each + and - charge will be attracted and repelled symmetrically in linear trajectories and in opposite directions which will generate the two coherent and opposite waves which will annihilate in situ. So the interesting consequence of this is that we can then propose that all the dipole substrata elements present in a certain zone of space in neighboring entities will be, from their dipoles, oriented identically, parallel to each other, in the same direction (that of the EMW electric vector in the area). But between immediate neighbors they will be with opposite directions of polarities by symmetrical attractions + and -, which organizes as much as possible the neutrality and especially the temporality for all the points (or rather the very small zones) inside the EVTD². Regarding gravity and electrostatics for masses and charges not too distant from each other, we deduce that on the centers axes, the concerned the EVTD² have the Substrata rods all parallel oriented to each other in each case of species. This is a good conjuncture for the physical processes which must take place on and around the centers axis, necessarily using this well-adapted uniformity. *So it turns out that the Substratum would be the material substrate, sensor and good receiver of the permanent energy of the EMW, since it is itself electromagnetic in nature.* By extrapolation one can think that black holes could be zones, according to their sizes, of more or less high density in Substrata elements which would allow to store in relation for the same volume on the one hand, of conventional atomic matter (with all its constituent elements which occupy volume), for example, and on the other hand for a black hole zone, much more energy by the fact that here there is therefore less disturbance in a black hole for the high concentration of receptors Substrata. Indeed, *the atom is more heterogeneous and disruptive for storing energy than must be inside a black hole empty of all other condensed matter except the Substrata elements.*

Perhaps the most important characteristic of the Substratum concerning the possibility that it has a role to play in the physical phenomena at play for gravity and electrostatics has just been put into relatively suitable elementary proposals. What follows will therefore consist in proposing ideas which try to understand, in logic and simplicity, what role can this Substratum, within the framework of a quantum space-time EVTD², accomplish or even participate in it in the two gravitational behaviors and electrostatic?

Role of the Substratum in quantum phenomena: gravity and electrostatics in space-time EVTD²

Recent work (7-10) relating to the length of the various segments or quantum stages of electric potentials (also for the stages of photonic levels in gravity) is scalable and calculable depending on the case, but as a general rule the length of the stages increases when moving away from the load in question or even from the neutral mass. It was found, in the zone of the resulting potential zero, that the lengths of the steps of the quantum electrostatic potentials, symmetrical two by two on either side of this zone (or point) zero, *were calculated identical (two by two) as well as the relative "frequencies" in energy levels per meter: n_{qe} and p_{qe} representing the average linear density in potential energy towards each of the charges concerned up to the zero zone.* It is the same for the stages and "frequencies" in the case of gravity. It is the same for the stages and "frequencies" in the case of gravity. But these calculations have found their accuracy, in electrostatics, in the

use of the eV as a quantum value for the hierarchy of the levels of the electric potentials of the field. This in analogy with the revisiting of photonic quantum gravity (Conte, 2015) which it, differently, correctly uses Planck's quantum h . It is the compaction work of the EMW on the Substratum elements contained in the neighboring EVTD² entities which must generate all this in the appropriate zones which ultimately generate gravity and the attractive electrostatics: that is to say the approximations of opposite masses or charges attracted to the zone of the resulting zero potential which in this case plays a role comparable to the attractive action of a mini black hole.

So the center of the main actions of attraction, in these conceptions of gravity and electrostatics (+ and -) in EVTD² theory, appears to be the zone of the resulting potential zero and of its immediate conforming environment which could be occupied by a mini hole black acting, in this case, of a vacuum cleaner towards each of the opposing masses and charges. As has just been planned, the Substratum would be, just as much as in the rest of the space, the substrate of the interior of the mini black holes of which it was question but with densities in Substratum almost equal to those of the surrounding areas on the center line. In addition, it is very likely then that there is a single uniform value of this density of elements in all the EVTD² constituting the mini black hole. Indeed, this has already been demonstrated in the revisits of gravity and electrostatics (Rosca, 2015, Conte, 2015) the spatial frequencies of the energies on either side of the zero zone are calculated equal so a fortiori in the central zone of the zero potential which would be occupied by a mini black hole. Therefore, for this type of black hole there must be a perfect homogenization of the particular internal energy levels of the Substrata elements which are energy collectors up to a certain level. Indeed, it is conceivable that such small elements such as *Substratum (or Substrata) are, in particular, inherently limited to a relatively low level of electromagnetic energy storage.* But given the very large number of these elements it follows that very large amounts of energy, in a relatively small volume, can be stored which would allow a better understanding of the enormous powers that could be contained in very massive black holes. Regarding the different possibilities of generating repulsive effects in the surrounding spaces either charged bodies of the same polarity (Conte, 2015), or in areas other than those where the attractive effects of quantum gravity EVTD² between neutral masses are manifested (Urban, 2021), it is undoubtedly necessary to recommend multidirectional orientations concerning the rods of Substratum. This generates anachronisms of disparate arrangements in the interior of the EVTD² entities *thus creating inhomogeneity with non-temporal resultants* which is absolutely contraindicated in the interior of an EVTD² entity where all the very small areas must be identical and homogeneous in being moreover subjected alternately to the phases of the EMW over time.

Respective roles in gravity and electrostatics attractive modes

For this part of the current study there are the findings of the respective approach of masses and opposite charges in gravity and electrostatic which are reliable data. But also the equal forces which act on the same mass (gravity) or again respectively on two charges of the same value but of opposite polarities (electrostatic) which would be placed at the points of the respective resulting zero potentials. This last observation is, here, of great importance because it means, without doubt, that

any neutral or electrified body (itself or by an adequate electric field) undergoes, in the zero zone, equal forces towards each of the body.

So the Substrata material elements are subjected in this zone in the same way: symmetrical and equal. For the rest, it will be necessary to formulate numerous hypotheses and use the adapted consequences of these observations. The neuralgic center of these two types of attraction is undoubtedly the zone of the resulting potential zero and the centers axis of the considered bodies (neutral or charged). In Figure 1 are shown respectively the energy levels equal two by two in length on the axis and the same levels on both side of the zero point for two masses of equal value (for a simple and illustrative case). So the zero resulting potential O is in the middle of the level here central (figure 1): it plays in a way the role of a neutral zone separating the two same levels and symmetrical of the same lengths L on both side of the zone zero. The Substrata elements of the closest level L to the mass m_1 will be symmetrically attracted by m_1 and m_2 , hence canceling the effects, but on the other hand they will undergo a photonic pressure slightly greater than that caused by m_2 , which will push them towards and in the particular level of zero potential (around O). This will happen exactly symmetrically with regard to the Substrata elements of the other level L close to m_2 . In fact, the photon pressure in the left level L of the diagram caused by m_1 is less absorbed than that coming from m_2 which must cross the zero level with an additional absorption. For this reciprocal pressure effect, the exact opposite occurs for actions in the L -level on the right. So much so that *these reciprocal effects will initiate and allow to generate the symmetrical compactions of the two level L in the zero zone level because all the elements concerned are homogeneous with each other* and they can therefore coexist together in the EVTD² constituting the mini black hole of zone zero.

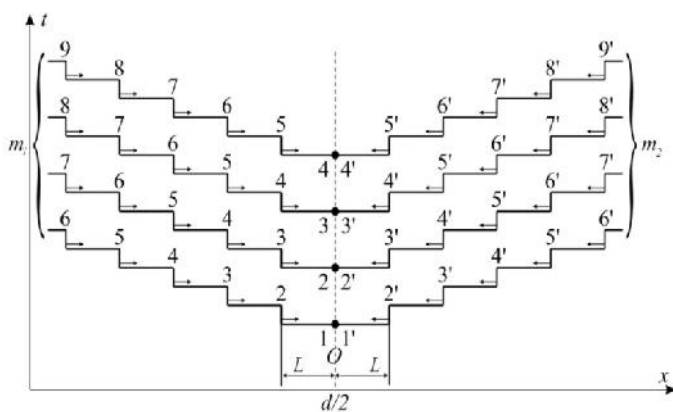


Fig. 1. Comprehensive and illustrative schema of the energetic potential distributions at quantum levels for two identical masses. Illustrations of the initial compaction stages between quantum levels and attractions of each of the masses by the intimate link between masses and its energetic potentials

The symmetrical process of the multiple compactions of the energy levels equal two by two on both sides of the resulting potential zero is identical and its sequence follows that which was initially described for the two L levels. So we can deduce that the approach of the two bodies, at the end of the action of the process, would be symmetrical and equal in displacements, in speed and acceleration: *but this is exactly in conformity only for equal masses or opposite loads of the same value.* So for

different masses and loads, the findings of which are diversified with regard to the final results, it appears that the behaviors of the final actions are modified in these cases. One is then led to believe that the levels on the heavier mass or higher load side are no longer fully compacted but that there is only some proportional migration of Substrata elements into their neighboring new levels. Thus the restructured levels closest to the zero zone see their energy levels increasing, and the compaction continuing will displace the equipotential of gravitation or electric fields by level together in accordance with the two masses or charges of different values and, *at the same time, the zone of the resulting potential zero is repositioned in a conforming way since it is ultimately the center of actions.*

We can also think of certain characteristics and effects induced by the propulsions which have been admitted in the quantum gravity EVTD² and which result from positive pressures adapted to the masses approach and which are active behind each of them (Conte, 2008). It is very possible that the actions of these pressures, by causing very small movements of initial approximations, set in motion the processes of reciprocal attraction towards the zero zone by correctly initiating the compaction of the concerned energy levels on the centers axis. Thus, as the compactions are carried out, the more and more of them caused by the previous ones, *this will induce bodies' approach, which will accelerate over the course of the action.*

Comprehensive roles of the Substrata in the various areas of repulsive action in gravity and electrostatic repulsion

For a space-time structured in quantum entities EVTD² it is a lack of the perfect homogeneity of all the constituents of these entities which generates inside certain EVTD² (being non-temporal), the appearance of negative pressures, that causing, when possible, restructuring into multiple entities in order to group the different cases into new, well-homogeneous entities. There is in fact, in the concerned zone an expansion of the various elements between them, which also causes an expansion, for example gravitation equipotential curves or of electric fields. Thus this means, potentially or really, forces of bodies' separation responsible for these *non-homogeneities in space-time so that everything becomes, as much as possible, with respect for real temporality* within the constituents of the EVTD² in the affected area. It was above mentioned that the dipoles of the Substrata were subjected to the orientation caused by the various dominant electric fields in the environment of the charged bodies (in electrostatic) whereas for the quantum gravity generated by the black body equivalent radiation of the electrically neutral masses the Substrata are associated in pairs in opposite polarity in the direction of the electric vectors of the electromagnetic waves of each of the masses and this best dampens the effects of the alternations of phase of these vectors while ensuring as much as possible the stability of the associated bi-dipoles. Ultimately it would not be impossible that in the electric fields of charged bodies, despite the previous presumption, the Substrata do not associate in correct couplings of their rods, this would improve the homogeneity of their small electric charges inside the EVTD², which would lead to better internal temporality. Thus the mono or bi rods of Substratum in the zones of the surrounding space of the bodies where different values of negative pressures are generated will be globally oriented in a sufficiently non-parallel way to induce a lack of the essential temporality inside the concerned EVTD². It is therefore, due to

their disparate orientations of the electric vectors of the Substrata dipoles, that there is real concretization of the multiple small negative pressures whose sum can make notorious repulsive forces, until dominating the force of attraction in gravity like this could explain what is called the expansion of the Universe (erban, 2021).

CONCLUSION

According to this study, the matter elements of Substratum would be innumerable in space-time and more precisely in the EVT² entities by being good receivers of electromagnetic energy but also they would be subject, in their locations, to the orientations of the dominant electric vectors in relation to their electrical bi polarity. These different intrinsic characteristics make possible understanding, in a certain way, their initial and basic roles and participations in the actual realization of the consequent effects of gravity and electrostatics. The manifestations of positive and negative pressures in the areas of concerned space-time can also be explained by the work of the EMW on the Substrata elements in perfect homogeneity in the temporal EVT² entities on one hand, and by their excessive disparities in entities where temporality is not respected, on the other hand. Thus the respective dual attraction-repulsion forces in gravity (erban, 2021) and in electrostatic would be generated but the repulsion is valid for charges of the same polarity as well as in certain cases of very large spacing between distant galaxies (erban, 2021) where the repulsion would be dominant compared to the corresponding decrease in the attraction effect in dual gravity EVT².

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