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RESEARCH ARTICLE

ENERGY STORAGE, IN EVTD², IN MOLECULAR VOLUME OF CH_4 JUSTIFY AN EFFICIENCY OF ABOUT 25 TIMES IN COMPARISON WITH CO_2 IN GREENHOUS

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ABSTRACT

The classical interactions in gravity and in electrostatics have been revisited in (1-4) and it follows that the temperatures in black body equilibrium are taken into account for the neutral and charged masses. This new conception of the black body radiations effects in photonic fields which are superimposed in the structure of space-time in quantum entities $EVTD^2$ requires that inside the entities exist material elements (concretizing the intimate substrate of space-time) to capture and store these electromagnetic energies, which were originally named "Substratum" (5). These Substrata corpuscles 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. So, this Substratum subjected to positive pressures would be a good sensor of electrostatic energy (photons) but also a good provider of returned caloric energy, for example in greenhouse effects for its atmospheric environment if necessary. These are the starting points for a certain understanding of the different greenhouse effect yields of CO_2 and CH_4 molecules, whose $RECH_4$ / $RECO_2$ ratio is recognized as being in the neighborhood of 25. We must therefore determine what is the common and quantifiable correlation between these molecules that makes it possible to approximate it to 25. It is a question here of determining, at best, the respective intrinsic and adapted volumes of compliant energy storage of these two gases.

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INTRODUCTION

It will be a question here of the elements or of the unitary 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 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 $EVTD^2$ entities in the basic volumes of this fully quantum all space-time theory (dimensions and time).In addition, it is necessary that this basic Substratum (electric dipole) does not intrinsically emit photonic radiations in space because there is no observation in this direction: it is then possible to make its connection with what is currently called in Physics dark matter and dark energy according to the positive or negative pressures to which it is subjected. Questions can be asked in order to know what are its behaviors, 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 $EVTD^2$ a certain number of publications have proposed new ideas concerning the principles of physical phenomena which would make it possible to understand how the gravitational approximations and distances (4,6,7) really work between two electrically neutral masses but also the attractions and repulsions that exist between electrically charged bodies: *what the simple statements of Newton and Coulomb do not offer*. The manifestations of positive and negative pressures in the concerned areas of space-time are also explained by the work of the EMW (Electromagnetic Mother Wave) on the Substrata elements in homogeneity in perfectly temporal $EVTD^2$ entities on the one hand and by their excessively large disparities in entities where temporality is not respected on the other hand. Thus, the respective forces - dual attraction-repulsion in gravity (8) and in electrostatic, would be generated. In the adapted zones surrounding real bodies, where are manifested negative pressures, there would be, in a way, *multiple white holes which would be analogous to gushing fountains*. In the $EVTD^2$ theory it would be adapted numbers of Substratum elements which, potentially or actually would spring from these zones while being under the influence of a negative pressure: *which is quite similar to dark energy according to the current name*. 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. Regarding the different possibilities of generating repulsive effects in the surrounding spaces either of charged bodies of the same polarity (8), or in areas other than those where the attractive effects of quantum gravity $EVTD^2$ between

neutral masses are manifested, *it is undoubtedly necessary to recommend multidirectional orientations concerning the Substratum dipoles*. This generates anachronisms of disparate arrangements in the interior of the EVTD[2] entities thus *creating inhomogeneities with non-temporal resultants which is absolutely contraindicated in the interior of an EVTD[2] 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*. Due to the fact that inside and outside the atoms of the two molecules CH_4 and CO_2 there are zones with positive pressures and others with negative pressures and even for the most distant zones of neutral or weak pressures, *it is necessary here to take into account only the zones with positive pressures where the energy storage is the only one really possible*. In fact, *areas with negative pressure* (gushing fountains) and even very low pressure *do not allow additional energy storage because they do not promote more elements or energy in their EVTD[2]*. Positive pressure zones, in the case of gravity between electrically neutral particles such as C, O and H atoms in CO_2 and CH_4 molecules, are included, as we have advocated in theory gravity EVTD[2], in intra vortices on the one hand, between each pair of opposite masses and on the other hand, external vortices behind these masses (9) and (10). These vortices are aligned with the axis of gravity of these masses and also behind each of them in the outer extensions. These are volumes that can be assimilated with conics which could have here, in simplification, a solid angle common to the vertices of each of them which would be slightly greater than that of the other type of conic. This is because of the better parallelism between the is gravitational curves of the two masses in question.

CO_2 MOLECULE: VOLUME OF ZONES SUITABLE FOR ENERGY STORAGE AND NOT SIMILAR TO THOSE OF CH^4: The CO^2 molecule is elongated like a rod with the two oxygen atoms aligned symmetrically on either side of the central carbon atom. The radius of carbon is given for 0.70 Angstrom, that of oxygen atoms is 0.66 Å in the case of a double bond, while the interval between the carbon atom and each of the oxygen atoms is given identical to 1.163 Å (Fig. 1).

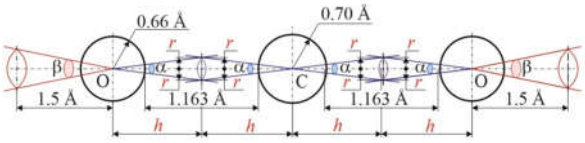

Fig. 1. The geometry of the CO_2 molecule and the areas of intra-atomic vortices and atomic outer vortices where positive pressures are generated by the gravities between respective atoms in EVTD[2] theory

The conical-shaped vortices are supposed to represent as well as possible and also in a simplified way, the zones of positive pressures in the molecule and in its very close environment. For the start of the calculations of their volumes we are going to take for all the cases of figures a certain solid angle at the vertices of the conics of an approximate value, here for this type of intra conics, of a 20 Sr (which may seem suitable). Since it is a question of making comparisons of the same thing (the volumes of CO_2 and CH_4) it is sufficient to use the same pseudo-suitable parameters when one does not have recognized adapted data. The length between the center of gravity of C and each of the centers of the two O is here equal to:

$$L_{C=O} = 0.7\ \text{Å} + 1.163\ \text{Å} + 0.66\ \text{Å} = 2.523\ \text{Å}.$$

This approximate simulation of the different conics in space of the two C = O double bonds of CO_2 makes it possible to design areas where the two types of is o-gravitational potential curves are roughly parallel to each other (Fig. 1). These portions of curves therefore ensure correct homogeneity in the EVTD[2] and therefore of their internal temporalities T necessary for the generation of these larger positive pressure zones. As the four conics, for this molecule, are symmetrical on both sides of the central atom C, they have identical heights *h* it will result that the overall volume, between the three atoms, of the various positive compacting zones will be four times the volume of one of these identical conics. So, it will be necessary to determine their common height *h* and the basic common radius *r*, in order to calculate the volume of one of the four conics. The value of *h* like that of *r* are simple since *h* is half of $L_{C=O,}$ hence:

$$h = {}^{L_{C=O}}/_{2} = {}^{2.523}/_{2} = 1.2615\ \text{Å},$$
$$r = h \cdot \tan 10\,^{\circ}, = 0.2224365\ \text{Å}.$$

We then apply the relation giving the volume of a conic multiplied by four to obtain the overall volume of the zones with positive pressures between C and the 2 O:

$$V_{4\ cones} = 4\frac{\pi \cdot 1.2615 \cdot (0.2224365)^2}{3} = 0.26145\ \text{Å}^3.$$

VOLUME OF CERTAIN ZONES SUITABLE FOR ENERGY STORAGE FOR THE CH^4 MOLECULE: The CH_4 molecule is larger in volume than the CO_2 molecule, especially with its four H atoms around the central C. The space between the C atom and each of the H atoms is given as 1.087 Å, while the angle between the different C-H directions in pairs is given as 109°. So, the four H atoms are in some symmetry around the central C. In addition, the radius of the atom of H is given as 0.53 Å, and 0.70 Å for the radius of C. The spatial configuration of the CH_4 molecule is shown in figure 2 with each of the identical $L_{C\text{-}H}$ distances between the respective centers of gravity of C and each of the four H:

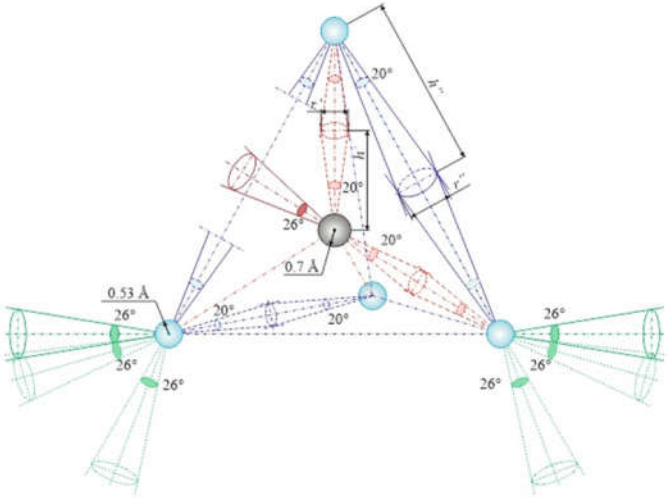

Fig. 2. The geometry of the CH4 molecule and the areas of intra-atomic vortices and atomic outer vortices where positive pressures are generated by the gravities between respective atoms in EVTD[2] theory

We must also consider for CH_4 that the solid angles of the conics taken into account here for the zones of positive pressures between C and the four H are always equal to 20 Sr and therefore, that *the number of these identical intra-atomic conics is here of eight volumes*. These conics will therefore have a common height *h* of half of $L_{C\text{-}H}$ and a base radius r, i.e.:

$$h' = {}^{L_{C-H}}/_{2} = {}^{2.317}/_{2} = 1.1585\ \text{Å},$$
$$r = h \cdot \tan 10\,^{\circ} = 0.204275\ \text{Å}.$$

We then apply the relation giving the volume of a conic multiplied by eight as to obtain the overall volume of the positive pressures intra C and the 4 H:

$$V'_{8\ cones} = 8\frac{\pi \cdot 1.1585 \cdot (0.204275)^2}{3} = 0.405\ \text{Å}^3.$$

In addition, with regard to the conics, at positive pressures between the 4 H between them, there are a total of six pairs: that is to say, *twelve identical conics interconnecting each H intra-atomically to another H*. For the calculations of these volumes, we must use the distance $L_{C\text{-}H}$ and for example the angle of 35.5° at the center of gravity of an H in one of the triangles HCH. We will thus be able to determine the common and identical height h'' of the two conics (between H and H) and their common base radius r'':

$h'' = 2.317 \cdot \cos 35.5° = 1.886306$ Å,
$r'' = h'' \cdot \tan 10° = 0.3326$ Å.

We can then determine the volume of one of these conics and it suffices to multiply it by the twelve conics to obtain the overall volume$V''_{12\ cones}$cones for these zones at positive pressures between the 4 H of CH4 between them:

$$V''_{12\ cones} = 12\frac{\pi \cdot 1.886306 \cdot (0.3326)^2}{3} = 2.6222\ Å^3.$$

The sum of these overall $V_{intra\ CH4}$ volumes of these two series of cones intrinsic to CH_4 is:

$$V_{intra\ CH4} = V'_{8\ cones} + V''_{12\ cones} = 0.405 + 2.6222 = 3.0272\ Å^3.$$

OTHER ZONES WITH POSITIVE PRESSURES: "COMMON TRUNK" AND DIFFERENCES IN NUMBERS FOR CO_2 AND CH_4

Common trunk" for CO_2 and CH_4: It is necessary to add up the volumes occupied respectively by the three atoms of CO_2 and by the five atoms of CH_4 which are heat energy storage areas like all material bodies. C is common to both molecules and, it is therefore sufficient to determine the respective overall volumes of 2 O on the one hand, and 4 H on the other hand, for this comparison. These are spheres for which we know the values of the radii so:

$$V_{2O} = 2\left[\frac{4\pi\ (0.66)^3}{3}\right] = 2.40852\ Å^3 \text{and} V_{4H} = 4\left[\frac{4\pi\ (0.53)^3}{3}\right] = 2.449446\ Å^3.$$

The difference in this volume characteristic in favor of CH4 is therefore:

$$V_{4H} - V_{2O} = 2.49446 - 2.40852 = 0.086\ Å^3.$$

We therefore note that the volume comprising the three atoms of CO_2 and that of the five atoms of CH_4 are almost identical and, thus we *can either neglect their contributions, because they are equivalent in both moles, or take into account, for CH_4 this small difference in volume in the comparison of greenhouse efficiencies*. It seems physically more appropriate to neglect this small difference in volume between respective atoms since we are concerned here with positive pressure zones, which is probably not the case entirely inside an atom except for the volumes of the atoms adapted conical. So exit in taking into account this small volume of 0.086 $Å^3$.

Prevalence of volumes in the outer vortices behind each of the pairs of atoms initiating gravitational effects between them ($EVTD^2$ theory) in CH_4 compared to those in CO_2 and not included in the conics already considered. In the CO_2 which is a symmetrical mole on either side of the central C, the "rear" *vortices, on either side of C, C - O couples are more or less the same as the two intra conics of these bonds. on either side of the C* in the alignment of the C - O. *There is only one "back" vortex left for each of the O, so a total of two "back" vortices for the mole of CO_2*. Whereas for CH_4 there are four pairs of this type of vortex for the four bonds and gravity C-H hence eight vortices in these cases. In addition, between only the four atoms of H there are six possibilities of gravitational phenomena two by two: *which causes the generations of twelve "rear" vortices in these conjunctures*.

The overall sum of these rear *exterior vortices for CH_4 is therefore twenty "rear" vortices*. Compared to the case of CO_2, CH_4 has an excess number of these vortices, of identical sizes for CH_4 and CO_2, *so this number is eighteen* (18). To evaluate a suitable pseudo volume for the same structure of these vortices, it is necessary to estimate the angle at the top of these identical conics as well as a single average height value for all cases (for the simplicity of this first approach). It should be noted, for these exterior vortices, that the iso gravitational curves tend to be more parallel than in the intra-mass environment of gravity *so we can increase the value of the angle at the top of these rear conics and take for example β=26 Sr instead of the 20 Sr of the other type of conical.* The chosen height of the vortices, where there is the possibility of energy storage due to sufficient positive pressures will be estimated at the value of 1.50 Å. It is therefore necessary to determine the base radius of this type of conic:

$$r_{vext} = 1.5 \cdot \tan 13° = 0.3463\ Å.$$

The overall volume occupied by the eighteen V_{vext} conics is then:

$$V_{Gv\ ext} = 18\left[\frac{\pi \cdot 1.5 \cdot (0.3463)^2}{3}\right] = 3.3908\ Å^3.$$

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RESPECTIVE "NON-COMMON" VOLUMES OF ENEGIE STORAGE OF, CO2 AND CH4 MOLECULES BALANCE SHEET AND COMPARISON OF THEM: The particular and intrinsic overall volume of the zones with positive pressures in the mole of CO_2, not deductible from those identical or similar existing in the mole of CH4, that is to say not common or equivalent for the same greenhouse effect, was calculated to the value of $V_{4conesCO2}$ = 0,26145Å. In fact, it is not necessary to take into account, in a comparison, analogous things or parameters existing between the two agents in question for here a value of greenhouse effect in the Earth's atmosphere. Because the adapted zones of each of the moles, *which have equally partial influence for the greenhouse effect fulfill their roles equally for the atmosphere and therefore should not be considered automatically in a comparison*. In the same procedure for taking into account the volumes of positive pressure zones (not "common") of the mole of CH_4, compared to those of CO_2, we therefore find the particular global volume given by the sum of what has been retained:

$$V_{GlobalCH_4} = 3.0272 + 3.3908 = 6.418\ Å\ .$$

The ratio of the very specific and non-common volumes (positive pressure zones) of each of the moles CO_2 and CH_4, relative to their greenhouse effects, gives:

$$R_{GE\ eff\ CH4/CO2} = \frac{6.418}{0.26145} = 24.25 \sim 24{,}5.$$

It should therefore be noted that the comparison of these two relatively independent volumes with respect to each other of these two greenhouse gases: the $V_{Global\ CH4} / V_{Global\ CO2}$ ratio is very close to the generally accepted value of 25.

EXPLANATORY CONCLUSION TEST

To better understand the process followed in this work, we can make a certain analogy with the following illustrative story. Suppose two masonry workers begin to build a house. First of all, they work in perfect collaboration to build the foundations of this house, they each do an equivalent job: we can assimilate these perfectly shared construction effects to the "common core" of greenhouse effect equivalences of the volumes of the buildings - similar zones for CO_2 and CH_4.Then they each have to build a wall of small bricks on one side of the front door (analogy with $EVTD^2$). The mason who builds the right wall (assimilated for example to CH_4) is much more active and faster than his colleague working on the left side (CO_2).In fact, the one on the right cements, for example 245 briquettes, while at the

same time the one on the left only goes up to 10 briquettes. There is a cause for this: it is that at the end of the work for the foundations the left mason injured his hand and for the continuation of his work on this left wall he has a strong handicap and he also needs health breaks for his injury, hence his performance or less efficiency (24.5 times less) than that of the mason on the right. This original analogy may explain the better greenhouse effect of CH_4 compared to that of CO_2.

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