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Action Origin of the Cosmos

Hans Joachim Dudek

Retired, Auf dem Komp, Germany
Email: hans.dudek@t-online.de

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Abstract

In physical information theory elementary objects are represented as correlation structures with oscillator properties and characterized by action. The procedure makes it possible to describe the photons of positive and negative charges by positive and negative real action; gravitons are represented in equal amounts by positive and negative real, *i.e.*, virtual action, and the components of the vacuum are characterized by deactivated virtual action. An analysis of the currents in the correlation structures of photons of static Maxwell fields with wave and particle properties, of the Maxwell vacuum and of the gravitons leads to a uniform three-dimensional representation of the structure of the action. Based on these results, a basic structure consisting of a system of oscillators is proposed, which describe the properties of charges and masses and interact with the photons of static Maxwell fields and with gravitons. All properties of the elemental components of nature can thus be traced back to a basic structure of action. It follows that nature can be derived from a uniform structure and this structure of action must therefore also be the basis of the origin of the cosmos.

Keywords

Hamilton Principle as Global Law in Physics, Physical Information Generated by Action, Correlation Space, Charge- and Matter-Oscillators

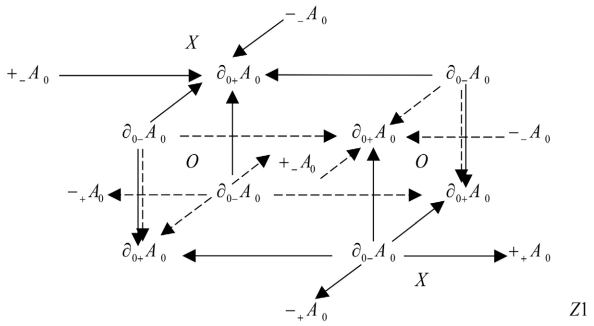
1. Introduction

In physical information theory (PIT), charges, masses, radiation and vacuum are represented by three-dimensional structures with four-dimensional fields on a correlation space. The correlation space is obtained by Fourier transforming the fields representing the elementary object (Lagrange density, commutators of communication relations) and forming with the obtained correlations [1] [2], under conditions of the Hamilton principle, three dimensional structures of the objects. The characteristic property of the obtained structures is the action,

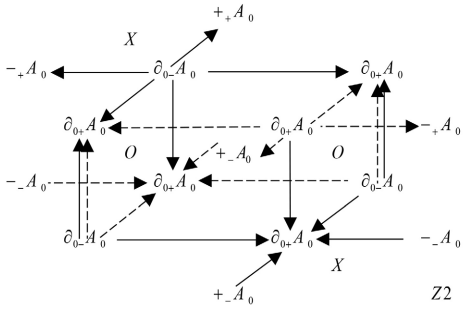
represented by four-dimensional commutators of quantum mechanics [3]. On the correlation space, the structures of the elementary objects form oscillators; the source of the action is described by a three-dimensional $\mu = 0$ oscillator, which can generate real positive or negative action, activated virtual action and deactivated virtual action, **Figure 1**. The representation of the $\mu = 0$ oscillator on the correlation space can be traced back to the commutators of the communication relations of quantum mechanics after a back transformation into space-time. In the interpretation of the PIT, the action is generated in the $\mu = 0$ oscillator by a positive and a negative current flowing during the change of state from the creators to the annihilators. The three different structures of the generators of action have been discussed in detail in [4] [5].

The aim of this report is to show that the correlation structures of charges, mass, radiation and vacuum can be traced back to a uniform structure of action. In [6] it has already been shown that one can construct generators of action that simulate the properties of masses. In order to describe masses and charges in the context of PIT, masses and charges from a system of oscillators will be constructed in this report. We postulate that these systems consist of $\mu = 0$ oscillators and it is shown that these describe the elementary objects and therefore represent a basic structure of nature. The basic structure of the action can therefore be regarded as the output of a structure of the prenatal cosmos [7] [8] [9].

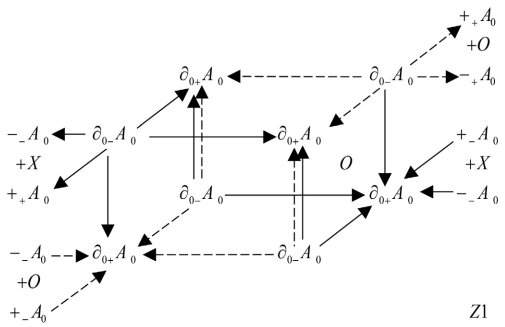
(A) graviton: O(–)-X(+);



(B) O-X-photon O(–) –X(–)



(C) photon of light O(+) and X(+), state Z1



(D) photons of light O(–) and X(–) state Z2

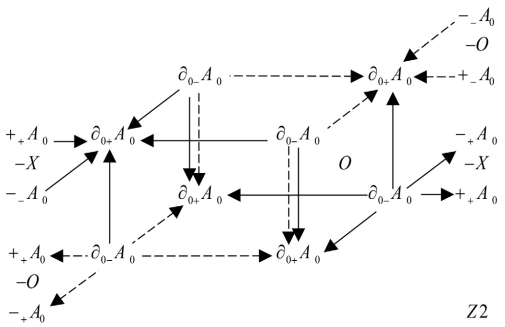


Figure 1. Spatial representation of $\mu = 0$ oscillators for a graviton O(–)-X(+) in (A), an O(–)-X(–)-photon of negative charge (B), overlapping photons of light O(+) and X(+) in oscillation state Z1 (C) and overlapping photons of light O(–) and X(–) in oscillation state Z2 (D).

2. Analysis Method

Previous reports have shown that elementary objects such as photons of static Maxwell fields, photons of light, charges, masses and vacuum can be described by structures on a correlation space with oscillator properties [4] [5]. Instead of describing the elementary objects, e.g., an electron, by a wave function, a distinction is made between the nucleus of the electron and the photon cloud surrounding it. The nucleus of the electron and its photon cloud are described separately by correlation structures with oscillator properties. On the basis of the description of elementary objects by correlation structures, the interaction between the static photons of the positive and negative charges and the oscillators of the charges will be discussed, as well as between the gravitons and the oscillators of the mass.

The photons of the static Maxwell fields are formed by superposition of O and X photons with different spins, which in turn are to be considered by superposition of two parts (1/2) and (0/3) [10]. As an example of a correlation structure of a photon of static Maxwell fields, the correlation structure of an O-photon of positive charges is represented in the relations (1)

$$
\begin{array}{ccccccccccccccc}
B_3 & \rightarrow & {}_{+}\mathbf{A}_1 & \leftarrow & B_1 & & & & E_2 & \rightarrow & {}_{+}\mathbf{A}_0 & \leftarrow & E_3 \\
\uparrow & & & & \uparrow & & & & \uparrow & & & & \uparrow \\
{}_{-}A_1 & & LO & & {}_{-}A_1 & & & & {}_{-}A_0 & & RO & & {}_{-}A_0 \\
\downarrow & & & & \downarrow & & & & \Downarrow & & & & \downarrow \\
E_2 & \rightarrow & {}_{+}\mathbf{A}_1 & \leftarrow & \partial A_2 & \Leftarrow & {}_{-}\mathbf{A}_2 & \rightarrow & \partial A_0 & \Rightarrow & {}_{+}\mathbf{A}_0 & \leftarrow & E_1 \\
 & & & & \Downarrow & & OZ1 & & \downarrow & & & & \\
 & & & & {}_{+}A_2 & & 1/2 & & {}_{+}A_1 & & & & \\
 & & & & \uparrow & & +0123 & & \Uparrow & & & & \\
B_1 & \rightarrow & {}_{+}\mathbf{A}_3 & \Leftarrow & \partial A_3 & \leftarrow & {}_{-}\mathbf{A}_1 & \Rightarrow & \partial A_1 & \rightarrow & {}_{+}A_2 & \leftarrow & B_2 \\
\uparrow & & & & \Uparrow & & & & \uparrow & & & & \uparrow \\
{}_{-}A_3 & & LU & & {}_{-}A_3 & & & & {}_{-}\mathbf{A}_2 & & RU & & {}_{-}\mathbf{A}_2 \\
\downarrow & & & & \downarrow & & & & \downarrow & & & & \downarrow \\
E_3 & \rightarrow & {}_{+}\mathbf{A}_3 & \leftarrow & B_2 & & & & E_1 & \rightarrow & {}_{+}A_2 & \leftarrow & B_3
\end{array}
\tag{1a}
$$

$$
\begin{array}{ccccccccccccccc}
B_3 & \rightarrow & {}_{+}\mathbf{A}_2 & \leftarrow & B_1 & & & & E_2 & \rightarrow & {}_{+}A_3 & \leftarrow & E_3 \\
\uparrow & & & & \uparrow & & & & \uparrow & & & & \uparrow \\
{}_{-}A_2 & & & & {}_{-}A_2 & & & & {}_{-}\mathbf{A}_3 & & & & {}_{-}\mathbf{A}_3 \\
\downarrow & & & & \Downarrow & & & & \downarrow & & & & \downarrow \\
E_2 & \rightarrow & {}_{+}\mathbf{A}_2 & \Leftarrow & \partial A_2 & \leftarrow & {}_{-}\mathbf{A}_0 & \Rightarrow & \partial A_0 & \rightarrow & {}_{+}A_3 & \leftarrow & E_1 \\
 & & & & \downarrow & & OZ1 & & \Downarrow & & & & \\
 & & & & {}_{+}A_3 & & 0/3 & & {}_{+}A_0 & & & & \\
 & & & & \Uparrow & & +0123 & & \uparrow & & & & \\
B_1 & \rightarrow & {}_{+}A_0 & \leftarrow & \partial A_3 & \Leftarrow & {}_{-}\mathbf{A}_3 & \rightarrow & \partial A_1 & \Rightarrow & {}_{+}\mathbf{A}_1 & \leftarrow & B_2 \\
\uparrow & & & & \uparrow & & & & \Uparrow & & & & \uparrow \\
{}_{-}\mathbf{A}_0 & & & & {}_{-}\mathbf{A}_0 & & & & {}_{-}A_1 & & & & {}_{-}\mathbf{A}_1 \\
\downarrow & & & & \downarrow & & & & \downarrow & & & & \downarrow \\
E_3 & \rightarrow & {}_{+}A_0 & \leftarrow & B_2 & & & & E_1 & \rightarrow & {}_{+}A_1 & \leftarrow & B_3
\end{array}
\tag{1b}
$$

The arrows describe the correlations between creator and annihilator; the double arrows describe the correlations of the commutators of communication relations. Bolt letters are positive, the other letters are negative. The generator of the action, **Figure 1**, is integrated in the $\mu = 0$ cube ∂A_0 of the structure in (1). Photons of static Maxwell fields are formed by O-X photons, the X photon emerges from the O-photon by reversing all correlation directions. The abbreviations ∂A_μ, E_i and B_i in (1) describe cubes of the form **Figure 1**; ∂A_μ are the unit cubes and E_i- and B_i-cubes describe, by means of their correlations, the electric and magnetic fields. All cubes are obtained from the trace of the energy-momentum tensor of the Maxwell fields. Within the framework of PIT, the gravitons can also be described by O-X structures with the help of the four-dimensional vector potential. Details are discussed in [4].

In the O-X photons of static Maxwell fields, four planes formed by currents are superimposed, which together form a three-dimensional structure, which after superposition of the currents consists of two planes: from a creator plane, which contains the sources of currents, and from an annihilator plane, into which the currents flow during a change of state. The oscillation of the photon occurs by flowing the currents from all creators of a creator plane to the annihilators in the annihilator plane and after completion of the oscillation state all creators convert into annihilators and vice verse. The $\mu = 0$-unit oscillator ∂A_0 generates real positive or negative action by two currents with different signs and different directions of circulation. In gravitons, activate virtual action is generated; for gravitons the two oscillators O and X have the same magnitude and different signs of action. The Maxwell vacuum consists of structures comparable to (1) [11], whose photons contain deactivated virtual action, in that the currents between creator and annihilator have different signs of the currents but the same direction of circulation; and delete each other in this way. By transforming the correlations of the unit oscillators back into space-time, it is shown that they form the commutators of quantum mechanics that generate positive, negative or vanishing action. In the following representations we consider the currents in the photons of the static Maxwell fields, which are formed in the two planes of the photons by the two four-dimensional commutators of oscillators O and X. We consider separately the currents formed by the correlations of the two commutators of oscillators O and X (and their extension by spin correlations) and the currents formed by additional present spin correlations and then superimpose both structures for an interpretation of the oscillation behavior of the correlation structures of Maxwell photons and their interaction with the oscillators of charge and mass.

In the subsequent analysis of the interaction between the static O-X photons and the proposed mass and charge oscillators, we assume that both the structure and the properties of the photons are forced by the Hamilton principle; this means that all structures are formed under the condition of minimizing the action. In PIT, the Hamilton principle is effective by minimizing the action in the

formation of correlation structures and in the interaction between them through three types of interactions: superposition (overlap), entanglement and induction [4].

From the correlation structures of the photons of static Maxwell fields, the positive and negative currents, separately caused by the correlations of the commutators and by the spin correlations, are determined. An example shows in Figure 2 the currents of an O-X photon of the static Maxwell fields with wave

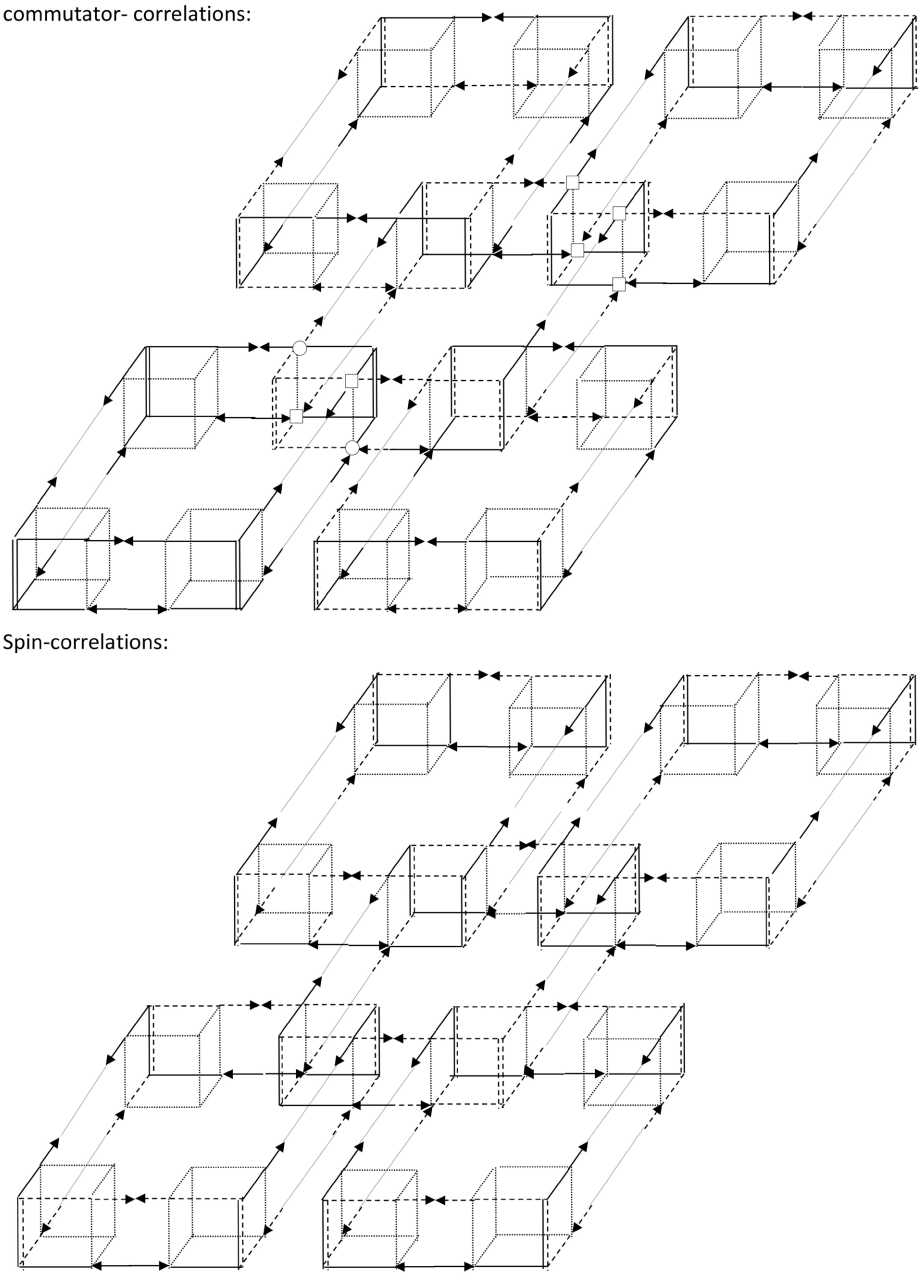


Figure 2. Spatial representation of currents in the correlation structure of a static photon $W1_{\beta}$ = OZ1(−)-XZ1(+) with wave properties. Positive currents are marked by continuous lines and negative currents by discontinuous lines, positive action marked by squares, negative by circles.

properties in its oscillation state $W1_{\beta}$. All structures of the currents discussed below are determined from the correlation structures of the Maxwell photons according to (1), which have already been determined elsewhere [4] [12]. To simplify the representation in **Figure 2** and in the following figures, all components of the vector potential in (1) are omitted, the correlations are represented only by arrows, and also the cubes, **Figure 1**, only by their positive and negative currents. Positive currents are represented by continuous lines and continuous arrows, and negative currents are represented by discontinuous lines and discontinuous arrows. As everywhere in this discussion, the currents run from a creator in the creator plane of the correlation structure through the cubes to an annihilator in the annihilator plane. Positive creators generate a positive current to a negative annihilator and negative creators generate a negative current to a positive annihilator. The currents always flow from a creator plane over the cubes, mediated by correlations of partial derivations of the vector potential in the cubes, along three spatial directions of the cubes, into the annihilator plane. This currents flow determines the structures of the Maxwell photons and, as will be shown, also the structures of the charge and mass oscillators.

3. Analysis of Currents in Photons of Static Maxwell Fields and in Gravitons

To describe the properties of the photons of the charges, the gravitons and the vacuum, there are two different types of O-X-photons that oscillate in two states. Each O- or X-photon of static Maxwell fields have a structure, like the relations in (1) and oscillate in two oscillation states Z1 and Z2. Each O-X-photon is formed from ten sets $\{A_{\mu}, \mu = 0,1,2,3\}$ of the vector potential and of sixteen cubes like **Figure 1**, representing the unity cubes and the E_i and B_i fields. The two parts (1a) and (1b), which in following called (1/2) and (0/3) parts must be overlapped to form an O- or X-photon and a static O-X-photon is formed by overlapping the two photons O and X. In following the currents generated by the $\mu = 0$ oscillators in the two O-X-photons for each property in their two oscillation states will be analyzed.

3.1. Currents in the Correlation Structures of Static Photons with Wave Properties

The wave properties of the static Maxwell photons exist in two photons O and X which oscillate with different contributions of the two signs of action in the $\mu = 3$ oscillator. For wave properties they are formed by the following structures: $W1_{\alpha}$ = OZ1(+)-XZ1(−), $W2_{\alpha}$ = OZ2(+)-XZ2(−), $W1_{\beta}$ = OZ1(−)-XZ1(+) and $W2_{\beta}$ = OZ2(−)-XZ2(+), where the sign in brackets indicates the sign of the action in the $\mu = 3$ oscillator and the two oscillation states of the O and X photons are described by Z1 and Z2. The correlation structures of static photons with wave properties are shown in [4] [12].

Figure 2 shows the currents generated in the static photons with wave prop-

erties in the state $W1_{\beta}$[1] for the commutator- and spin-correlations. Since each of the above states $W1_{\alpha}$, $W2_{\alpha}$, $W1_{\beta}$ and $W2_{\beta}$ leads to a structure comparable to state $W1_{\beta}$, only examples are reproduced here; in following the discussion refers to all four states.

Based on the representation of the currents, it becomes clear that always two currents comprise four cubes; in general, it is a positive and a negative current. This applies to both commutator correlations and spin correlations. Four of the 16 cubes of a photon of static Maxwell fields always form a unit. At the outer corners of the unit, positive and negative currents overlap leading in the vertical correlations from the creator plane to the annihilator plane. The static photon consists of five such units; each unit comprises four cubes connected to each other by two currents. The peripheral four-cube blocks (in following called four-blocks) of the photon are each superimposed with a cube of the central four-block, in which the four unit-cubes are contained (compare (1)). In this way, generated by the $\mu = 0$ oscillators, the current flows simultaneously between the states from all creators of the creator plane (in **Figure 2** from bottom to top) to the annihilators of the annihilator plane and by superimposing the correlations in the unit-cubes, information is transmitted to the other four-blocks.

The spatial currents for commutator and spin correlations for the four states $W1_{\alpha}$, $W2_{\alpha}$, $W1_{\beta}$ and $W2_{\beta}$ of the static photons with wave properties are determined. In **Figure 2**, the current curve for $W1_{\beta}$ is shown as an example. For each of the four states of the photons the currents are superimposed in the correlation structure of the static photons; they have in commutator- and spin-correlations the same direction, and they are simultaneously supplied with currents by the two $\mu = 0$ generators of the action of photons O and X during oscillation. Equally directed currents with the same sign of the currents superimpose constructively and with different signs destructively. The following discussion always takes place in the rest frame, in which, under the conditions of the Hamilton principle, all sources of action have the same amount of action and thus equal amounts of currents. Two different photons with wave properties are always formed simultaneously in each oscillatory state. At the same time, the two states are formed, which have the same direction of correlations: $W1_{\alpha}$ and $W2_{\beta}$ are formed simultaneously in one state and $W1_{\beta}$ with $W2_{\alpha}$ in the other state. Under these conditions for the four structures of static photons with wave properties, overlapping the currents of the commutator- and spin-correlations, gives the following results (**Table 1**):

- $W1_{\beta}$: (**Figure 2**) The $\mu = 0$ oscillators O and X both are positively activated, in $\mu = 3$ the X-oscillator is deleted by spin correlations and O remains positively activated. The transversal oscillators are deleted. The $\mu = 0$-four-block remains activated, the four-block adjacent to the $\mu = 3$ cube is activated with a positive current. The transverse four-blocks are deleted.

[1]Each of the properties of photons and gravitons includes four structures of the form **Figure 2**. In order not to overload this report with images, only one of these structures is shown in figures and the properties of all four structures are discussed. All four structures belonging to a property are contained in a new appendix 11 of [4].

Table 1. Sign of action in μ-cubes and in four-blocks for wave properties of static photons. ("+" positive action, "−" negative action, "0" action deleted, "±" and "∓" positive and negative currents).

	O	X	O	X	O	X	four-block		
	$\mu=0$	$\mu=0$	$\mu=3$	$\mu=3$	$\mu=1,2$	$\mu=1,2$	$\mu=0$	$\mu=3$	$\mu=1,2$
$W1_\beta$	+	+	+	0	0	0	∓	+	0
$W2_\alpha$	−	−	0	−	0	0	±	+	0
$W1_\alpha$	+	+	+	0	0	0	±	−	0
$W2_\beta$	−	−	0	−	0	0	∓	−	0

- $W2_\alpha$, both $\mu = 0$ oscillators O and X are negatively activated, in $\mu = 3$ the O-oscillator is deleted, and X remains negatively activated. The transverse oscillators are deleted. The $\mu = 0$ four-block remains activated, the four-block adjacent to the $\mu = 3$ cube is activated with a positive current. The transverse four-blocks are deleted.
- In $W1_\alpha$, both $\mu = 0$ oscillators O and X are positively activated, in $\mu = 3$ the X-oscillator is deleted and O remains positively activated. The transverse oscillators are deleted. The $\mu = 0$ four-block remains activated, the four-block adjacent to the $\mu = 3$ oscillator is activated with a negative current. The transverse four-blocks are deleted.
- In $W2_\beta$, both $\mu = 0$ oscillators O and X are negatively activated, in $\mu = 3$ the O-oscillator is deleted, and X remains negatively activated. The transversal oscillators are deleted. The $\mu = 0$ four-block remains activated, the four-block adjacent to the $\mu = 3$ cube is activated with a negative current. The transversal four-blocks are deleted.

From this follows:

- $W1_\beta$ and $W2_\alpha$ have parallel equally directed currents, are emitted simultaneously and form a unit by superposition, whereby the $\mu = 0$ oscillators are deleted, for $\mu = 3$ the oscillators O(+) and X(−) remain activated with opposite sign. When $W1_\beta$ and $W2_\alpha$ are superimposed, the $\mu = 0$-four-block is deleted and two positive currents are formed in the $\mu = 3$ four-block.
- $W1_\alpha$ and $W2_\beta$ have parallel and equally directed currents and are emitted simultaneously, the $\mu = 0$ oscillators are deleted, for $\mu = 3$ the oscillators O(−) and X(+) remain activated with opposite sign. When $W1_\beta$ and $W2_\alpha$ are superimposed, the $\mu = 0$ four-block is deleted and two negative currents are formed in the $\mu = 3$ four-block.

Conclusions:

This analysis is represented in Table 1. The two states $W1_\beta$ and $W2_\alpha$ as well as $W1_\alpha$ and $W2_\beta$ caused by overlapping of the single photons are each activated only in the $\mu = 3$ oscillator with positive action in O and negative in X, and the associated four-blocks have opposite sign of currents. In $W1_\beta$ & $W2_\alpha$ all other currents are deleted. Similar the state $W1_\alpha$ & $W2_\beta$ and the corresponding four-blocks are deleted in $\mu = 0$ and O and X have different signs in $\mu = 3$, again

positive in O and negative in X; the four blocks for $\mu = 3$ in $W1_\beta$ & $W2_\alpha$ are positive and for $W1_\alpha$ & $W2_\beta$ are negative. When both states interfere, all currents are extinguished; the interference occurs with the $\mu = 3$ four-blocks, which represent the E-fields (compare (1)): the two structures $W1_\alpha$ & $W2_\beta$ and $W1_\beta$ & $W2_\alpha$ form the wave properties of the material waves[2].

The formation of the states with wave properties takes place under the condition of the Hamilton principle: all currents are erased except those in the $\mu = 3$ oscillators. The movement takes place in $\mu = 3$ direction and is also a consequence of the Hamilton principle: by propagating the wave in the direction of $\mu = 3$, the action is minimized, because the two successive states have opposite sign of the action. The interaction with the charge oscillators in wave properties will be investigated in more detail below. It leads to the modification of these results.

3.2. Currents in the Static Photons with Particle Properties

As the previous work shows [13], with an inelastic interaction (exchange of real action) the oscillation behavior of the static photons changes and the wave properties change into particle properties. The state in which information is absorbed in the form of a four-dimensional delta of the communication relations in the oscillators of charges and the mass is called the exchange state, the following state, in which the absorbed information is processed in the oscillators of mass and charge, and in which the information in the photon cloud is reabsorbed, is called particle state. In the particle state, the interaction also takes place in the photon cloud with photons of an interaction partner to form the delta of the information. The information absorbed in the photon cloud in the particle state is transmitted to the charge/mass oscillator in the exchange state. We want to investigate this process in connection with the charge/mass oscillators below.

The particle properties are formed by the photons of particle by O(+)-X(+), for anti-particle by O(−)-X(−), where the sign in brackets describe the sign of action in the $\mu = 3$ oscillator[3]. In contrast to the wave properties, where there are two similar oscillation states for each of the two types of photons, the two oscillation states are fundamentally different in the particle properties of particles and anti-particles: one state the exchange state is deactivated and the other state has real action, which forms the charge in the photon cloud, forms the electric fields and causes the exchange of real action. At the same time, with the absorbed delta of information, a change in the action and a change in canonical

[2]Wave propagation occurs by induction: in one oscillation state together with the forming action, e.g. in state W1, the following state W2 is formed in vacuum; with transition of W1 into W2, the state in vacuum W2 is converting into state W1 and currents flow into this state. From this follows that both successive oscillation states have the same current directions, but different current signs [14].

[3]Quantum mechanics distinguish the sign of charges by the $\mu = 0$ oscillator [15]. The static photons have in particle state always different signs in their longitudinal oscillators. In PIT the sign of the $\mu = 3$ oscillator characterize the sign of the charge, because the sign of the $\mu = 3$ oscillator is for the charge oscillators in both oscillation states the same, while the $\mu = 0$ oscillator oscillate in the sign between the states.

momenta takes place [13]. How these structural properties of static photons with particle properties enable an interaction of the elementary objects, have already been analysed in connection with their interaction with the scalar oscillators [4] [13], and will now be discussed again below in interaction with the charge and mass oscillators.

The structure of the currents in the static photons with particle properties is illustrated by the example of the exchange state of the particle in **Figure 3**. The evaluation of all four structures (two states for particles and two for anti-particles) of the static photons with particle properties leads to the following results:

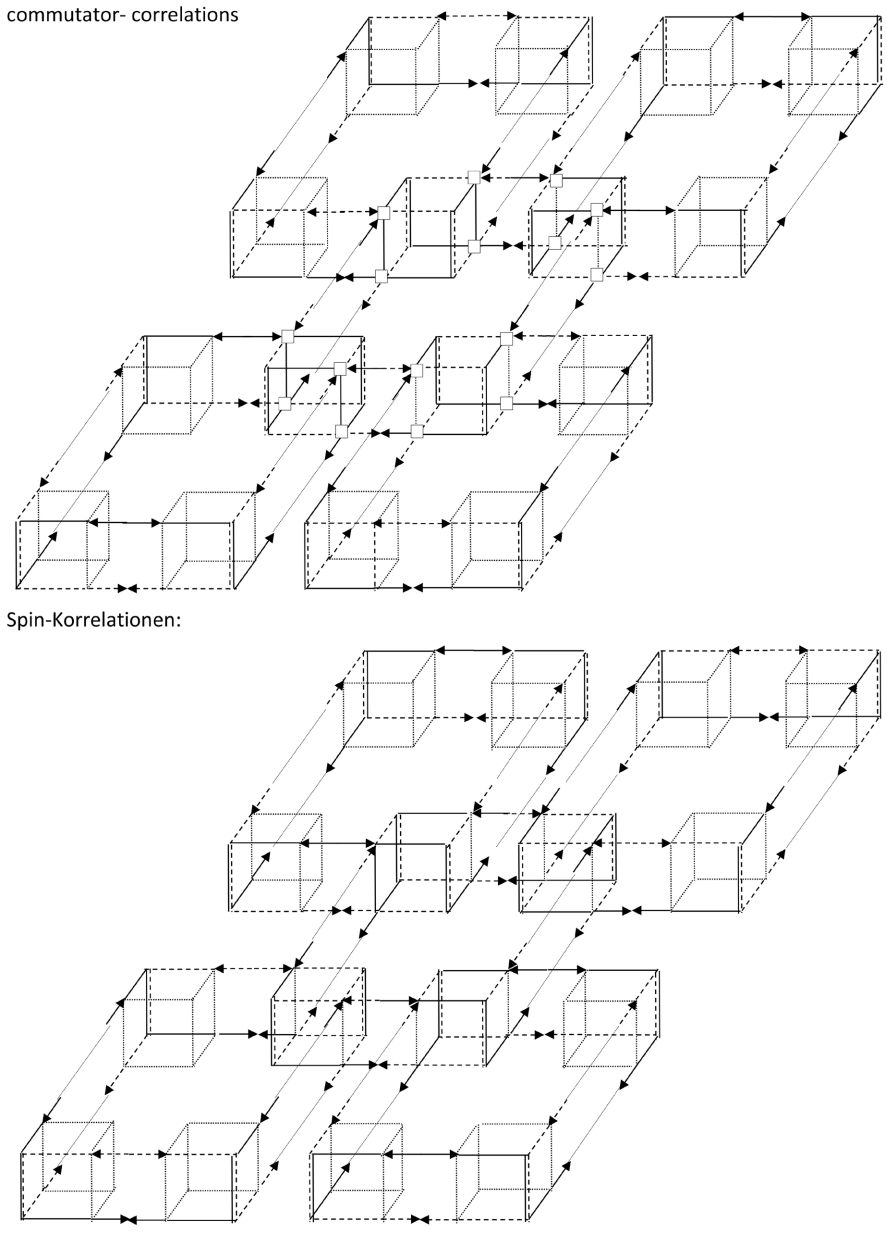


Figure 3. Spatial representation of currents in the correlation structure of photons in particle properties of a particle OZ1(+)-XZ1(+) in exchange state Z1. Positive action marked by squares, negative by circles.

Currents in the static photons with particle properties

Exchange states

Particle Z1, anti-particle Z2:

- All four μ-oscillators are positive in the currents of commutator correlations of particle. They are all erased by the spin correlations with opposite sign.
- Currents of commutator correlations in all four μ-oscillators are negative of anti-particle. They are all erased by currents of the spin correlations with opposite sign.
- In the four-blocks, all currents of commutator correlations are erased by the overlapping spin correlations.
- All currents and all sources are erased in the exchange state of particle and anti-particle.

Particle states

Particle Z2:

- The two $\mu = 0$ oscillators O and X in the $\mu = 0$ generator of the action are negative. They are superimposed by the currents of spin correlations with the same sign.
- The two $\mu = 3$ oscillators O and X are both positive. The O oscillator is deleted by spin correlations.
- The O and X oscillators in the transverse cubes are all positively activated in the commutator correlations, but are deleted by superposition with spin correlations.
- The currents in the longitudinal four-blocks are activated by superposition with spin correlations. The longitudinal four-blocks are forming the E-fields of positive charges [10].
- The currents in the transverse four-blocks are deactivated by superposition with the currents of the spin correlations.

Anti-particle Z1:

- The two $\mu = 0$ oscillators O and X in the $\mu = 0$ generator of the action are positive. They are superimposed by the currents of spin correlations with the same sign.
- The two $\mu = 3$ oscillators O and X are both negative. The O oscillator is deleted.
- The O and X oscillators in the transverse cubes are all negatively activated in the commutator correlations, but are each deleted by superposition with spin correlations.
- The currents in the longitudinal four-blocks are activated by superposition with spin correlations. They are activated with opposite sign compared to the particle in the particle state. The longitudinal four-blocks form the E-fields of negative charges, and the transverse four-blocks, which are deleted during the formation of the electric fields, form the B-fields [10].
- In electric properties the currents in the transverse four-blocks are deactivated by superposition with the currents of the spin correlations.

Conclusions:

The exchange states in particle Z1 and in anti-particle Z2 are completely erased and therefore satisfy the Hamilton principle of minimizing the action. The results for the particle state of particle properties are summarized in Table 2. In the particle state the $\mu = 0$ oscillators of the two O- and X-oscillators are activated: negative in the particle in Z2 and positive in the anti-particle in Z1. The O-$\mu = 3$ oscillator is deleted, X remains positive for $\mu = 3$ for particle and negative for the anti-particle in the O-oscillator. The longitudinal four-blocks forming the E-fields are activated in particles and anti-particles with different signs. The formation of electric fields occurs by activation with real action of the longitudinal parts of the particle state for particle and anti-particle with different signs. The transverse cubes and the transverse four-blocks are deleted, they form the B-fields in magnetic interactions [10].

The particle states satisfy the Hamilton principle: The particle states are activated by interaction in different states by superposition. The longitudinal oscillators have opposite signs: the $\mu = 0$ oscillator is negative for the particle Z2, positive for the anti-particle Z1, the $\mu = 3$ oscillator is positive for the particle, negative for the anti-particle. The transverse oscillators are deleted. The currents in the four-blocks of particles and anti-particles always superimpose destructively. In the case of interactions of photons of positive and negative charges with equal amounts of action completely extinguish each other. The discussion takes place in the rest frame without the influence of the interaction with the charge oscillators. The interaction with the charge oscillators in particle properties will be investigated below. This interaction leads to modification of the properties.

3.3. Structure of Currents of the Deactivated Maxwell Vacuum

The Maxwell vacuum in the PIT consists of a superposition of the structures of the gravitons and of the deactivated virtual vacuum, which is the carrier of the elementary objects and mediator of the information between them, but is not actively involved in the interaction. The gravitons have the same structure as the deactivated virtual vacuum; they consist of the superposition of O and X photons with equal amount of real positive and negative action. At this point, only the currents of the deactivated virtual vacuum will be briefly presented. The structure of gravitons is discussed in the context of their interaction with the oscillators of the mass.

Table 2. Sign of action in the particle states of particle and anti-particle. ("+" positive action, "−" negative action, "0" action deleted, "±" and "∓" positive and negative currents).

	O	X	O	X	O	X	four-block		
	$\mu = 0$	$\mu = 0$	$\mu = 3$	$\mu = 3$	$\mu = 1, 2$	$\mu = 1, 2$	$\mu = 0$	$\mu = 3$	$\mu = 1, 2$
particle Z2	−	−	0	+	0	0	±	±	0
anti-particle Z1	+	+	0	−	0	0	∓	∓	0

The deactivated virtual vacuum has a structure comparable to static photons; the cubes form, as with static photons, four-blocks. This is shown in Figure 4[4]. All four unit-cubes contain deactivated virtual action in the central four-block of the vacuum-photon. As a result, their oscillations are also distinguished from each other by superimposing positive and negative creators and positive and

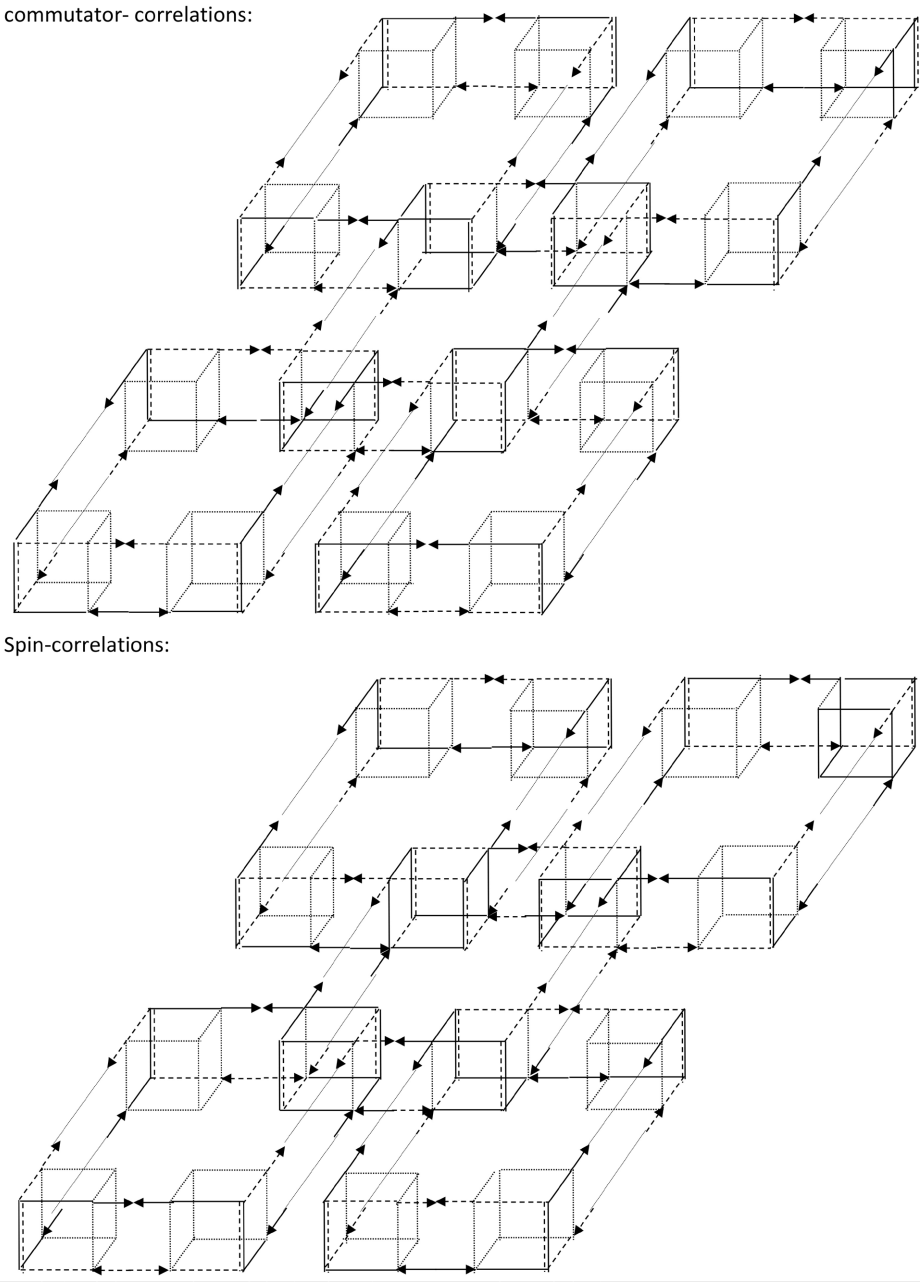


Figure 4. Spatial representation of currents in the correlation structure of Maxwell vacuum, state $V1_{\beta}$.

[4]The structure of the vacuum is shown here in an optimized representation in which all currents are extinguished. This is because all four unit-cubes were chosen according to a uniform pattern by currents of the same direction of circulation and with different signs. However, the unit cubes with deactivated action can be represented in two different ways; the action then remains deactivated, but not all currents are extinguished. This less ordered state should prevail in the real Maxwell vacuum.

negative annihilators; this deletion of creators/annihilators guarantees the independence of the four coordinates. The currents of the spin and commutator correlations in the peripheral four-blocks superimpose destructively in the longitudinal and transverse oscillators. This has an influence on the propagation of light, static photons and gravitons in vacuum: the currents of the transverse oscillators of the photons of light already flow into the correlation structures of the photons of the deactivated vacuum, **Figure 11**, when a state of the activated photons is formed. As with all other Maxwell photons, all currents are directed from a creator to an annihilator plane in vacuum. The photons of the deactivated vacuum can therefore continue by induction in space-time, similar to those of the other Maxwell photons. They then carry only structural information; their movement is therefore not subject to the conditions of the special theory of relativity [4].

An analysis of vacuum photons with deactivated action yields:

Properties of the currents of deactivated vacuum

- There are two different photons of deactivated vacuum, which oscillate in two states. The two variants of photons are derived from the photons with wave properties. Each of the four states ideally (all commutators formed in the same way) contains all currents deleted by superposition of the commutator and spin correlations.
- In the central four-block all four μ-oscillators of O- and X-photons are separated from each other, so that each of the four coordinates of the vacuum is independent of all other coordinates.
- The four peripheral four-blocks each contain a positive and a negative current; the currents are extinguished by superimposing the commutator correlations with the spin correlations.
- The two states of the vacuum variants can continue in the direction of vertical correlations, whereby the superimposed creator and annihilator planes completely annihilate each other. This also applies to the central four-block.
- $V1_{\alpha}$ and $V2_{\beta}$ as well as $V1_{\beta}$ and $V2_{\alpha}$ have synchronized vertical correlations and can superimpose.
- From the states with ideal formation of the commutator correlations, deviating states can be formed, in which the μ-unit-cubes are still deleted, *i.e.*, do not produce an activated action, but which nevertheless have zero different currents in four-blocks.
- In addition to the photons of the static Maxwell fields, the photons of dynamic Maxwell fields (of light) also form deactivated vacuum. Their interaction with the static vacuum corresponds to the interaction of the photons of the light with the vacuum (see below) [11].

Conclusions:

The deactivated vacuum is only indirectly involved in the interaction by being the carrier of elementary objects and of information. Each of the unit cubes in the central four block are separated between each other: the deactivated vacuum

defines the independents of the four μ-coordinates.

3.4. Structure of the Currents in the Magnetic Photons

The magnetic photons are formed by superposition of equally directed currents in the two photon parts (1/2) and (0/3) in both photons O and X and by superposition of the two different states with different signs of action in the $\mu = 3$ oscillator, in forming the following states: M1 = OZ1(+)-XZ2(−) and M2 = OZ2(−)-XZ1(+) or E1 = OZ1(−)-XZ2(+) and E2 = OZ2(+)-XZ1(−) [4]. In both parts and in both photons, the current directions are equally directed with different signs of the current. In the rest frame, all currents are extinguished. The structure of the photons consists, as with the other photons of static fields, of five four-blocks. In order not to overload the representation by structures at this point, the interaction of the magnetic photons with the charge oscillators will be investigated elsewhere; with the participation of scalar oscillators, this is already described in [4].

3.5. Structure of Graviton Currents

In the context of PIT, the gravitons, *i.e.*, the photons that interact with the mass, can be represented by static Maxwell fields. Their characteristic property is that they consist of two photons O and X with the same amount of action but different sign of action. The same amount of action arises under the conditions of the Hamilton principle. Within the framework of the PIT, the two gravitons O(+)-X(−) and O(−)-X(+) should exist in two states. Their correlation structures correspond to those of the O-X photons of the static Maxwell fields. In the following, we discuss the currents in the four states of gravitons using the example of the state $G1_{\beta}$ of the graviton O(+)-X(−), **Figure 5**:

Analysis of graviton currents

- There are two gravitons O(+)-X(−) and O(−)-X(+), which oscillate in two states with opposite sign of action and opposite circulation direction of the currents.
- All four unit-cubes are activated with the two oscillators O and X; O and X have currents with opposite signs and equal amounts of action. They form an activate virtual action. (The virtual action is active because it is exchanged in interactions [5]).
- All five four-blocks are activated in the currents with the same signs of the current. The currents have in both parts that by commutators and that by spin correlations the same direction but with opposite sign of the current. With the superposition of the commutator and spin-correlations the currents extinguish.
- In all states of the gravitons, all currents are completely extinguished by superposition of the commutator- and spin-correlations.

Conclusions:

In the context of PIT, the gravitons can be represented by means of the static photons using the four-dimensional vector potential. They are characterized by

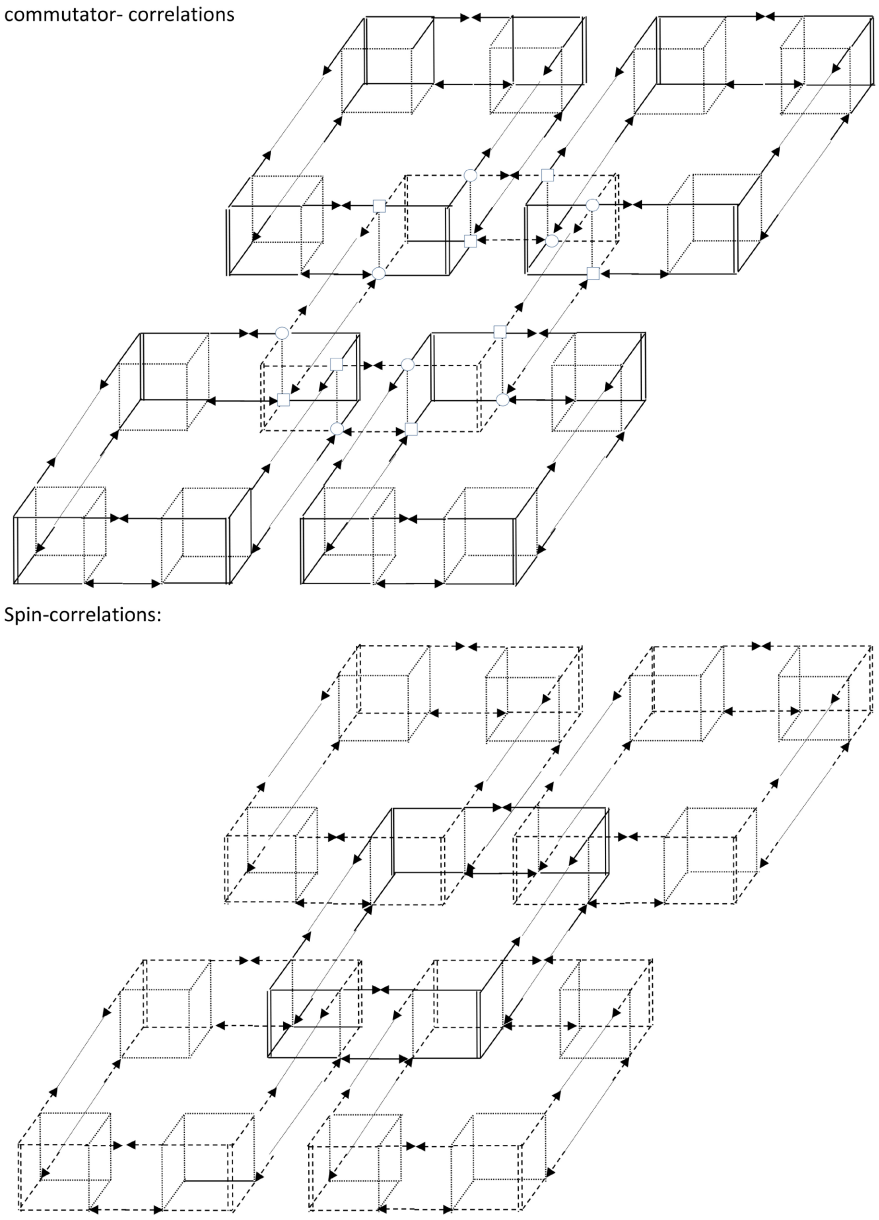


Figure 5. Spatial representation of currents in the correlation structure of gravitons; graviton $G1_{\beta}$.

activate virtual action; all currents in the correlation structures are extinguished. All four states completely satisfy the conditions of the Hamilton principle. The activation of the gravitons occurs by separating and simultaneously absorbing the positive and negative parts of the virtual action during the interaction [4] [5].

3.6. Structure of Currents in Photons of Light

The correlation structure of the photons of light differs considerably from the correlation structure of the photons of the static Maxwell fields. The photons of light separately form O and X photons, which differ by different spin direction

[14]. However, the correlation structure of light forms a similar structure of currents, which are divided into four-blocks. **Figure 6** shows the currents in an elliptically polarized O-photon with wave properties in the oscillation state Z1. Each of the four four-blocks contains a positive and a negative circulating current that connects the four cubes to each other, and each four-block is connected to two other four-blocks by a common unit-cube. In the example **Figure 6**, the upper layer is the creator plane and the lower plane is the annihilator plane. The photon moves from top to bottom in the drawing; all currents (characterized by two parallel vertical correlations) flow from the creator to the annihilator plane when the state changes. The structures of the currents of photons of light with particle properties are comparable to those with wave properties [14].

In addition to the interaction of Maxwell photons with charge oscillators, the interaction of photons with vacuum is of particular interest. Both interactions have in common that they interact with each other under the conditions of the Hamilton principle, through superposition, entanglement or induction. The interaction with the vacuum can be demonstrated using the example of the locomotion of the photon of light in a vacuum [4]. As the representation of the currents of the elliptically polarized photon with wave properties shows, all currents from a common creator plane, under the control of the $\mu = 0$ oscillator, run simultaneously in a common direction to the annihilator plane. The interaction of the photon with the deactivated vacuum is based on the fact that, on the one hand, the photon is already embedded in the deactivated vacuum and, on the other hand, that as a result of the flow of the currents in a uniform direction, under the conditions of the Hamilton principle, the following structure of the following state forms simultaneously. With the formation of the structure of the

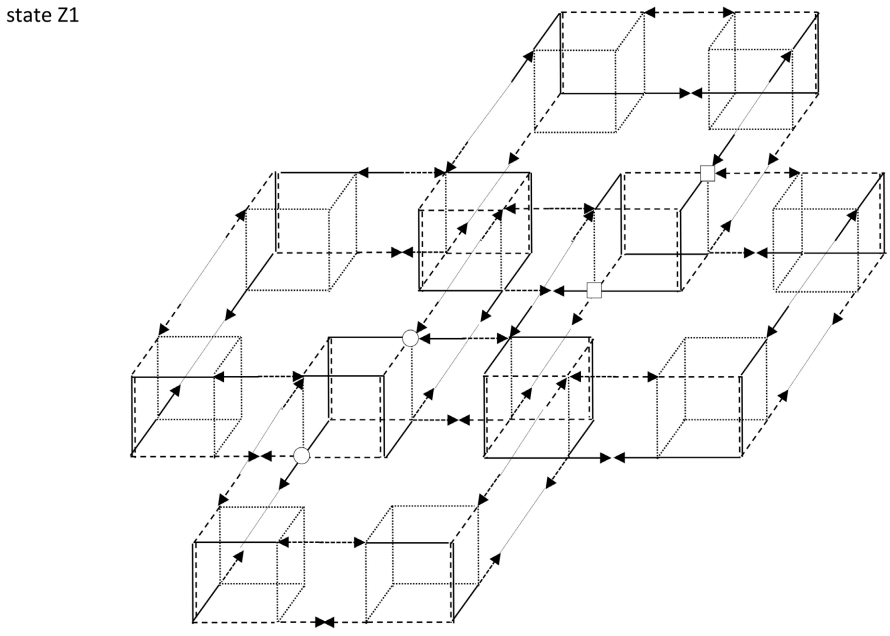


Figure 6. Spatial representation of currents in the correlation structure of an elliptically polarize O-photon in oscillation state Z1.

photon following its annihilator plan, the oscillation continues not within the structure of the photon, but under the flow of the current in the newly formed structure of the following state. The special feature of all Maxwell photons is this inductive continuation of the photons in vacuum, which takes place on the flow of the currents in the vertical direction of the structure, while the structures of the charge and mass oscillators, still to be discussed, oscillate in themselves, because they have both active creators and active annihilators in both planes of the oscillator and the currents flow simultaneously in all four vertical directions during oscillation, canceling each other (see below).

Results on the analysis of currents in the correlation structure of photons of light:

- The correlation structure of the photons of light contains four four-blocks, each overlapping with two of its four cubes.
- Only the longitudinal cubes with opposite sign of action in $\mu = 0$ and $\mu = 3$ oscillator are activated, the transverse cubes are deactivated like the deactivated vacuum. (This is in contradiction to the theory of S.N. Gupta and K. Bleuler [16])
- In the elliptically polarized photon, the currents of all four four-blocks are activated with a positive and a negative current.
- In all cubes, the vertical currents point in the direction of movement.

Conclusions:

The correlation structure of light differs considerably from that of static photons. Only the longitudinal oscillators with real action with opposite sign are activated: each state always contains the longitudinal oscillators with opposite sign of action. The photon of light satisfies the Hamiltonian principle in that the two successive states have opposite signs of the action in the two longitudinal oscillators.

4. Formation of Structures for Charge- and Mass-Oscillators

With reference to the correlation structures of scalar oscillators interacting with the photons of static Maxwell fields, a model of an oscillator was discussed in [6] that simulates the oscillator properties of masses in non-relativistic and relativistic acceleration ranges. From the point of view of PIT, charges and masses consist of a multitude of oscillators that oscillate together with the photons of the static Maxwell fields and with the gravitons and exchange and store information in interactions.

4.1. Correlation Structure for Charge and Mass Oscillators

Figure 7 shows a charge and mass oscillator, which consists of a sequence of elementary $\mu = 0$ oscillators. Four commutators were attached to each cube of the oscillator (two O-X oscillators), two of which describe positive and two negative action. Each of the four commutators describes real action in that the currents have different circulation directions and different signs. The signs of the

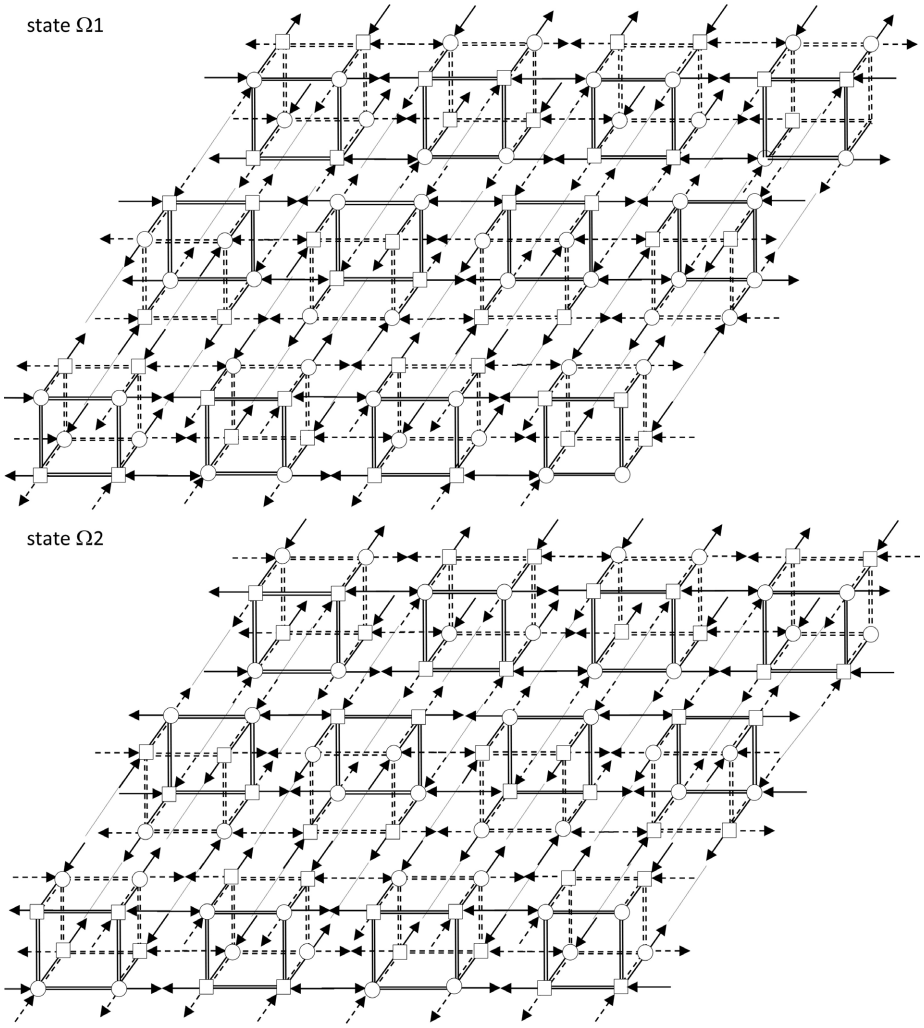


Figure 7. Spatial representation of the basic structure consisting of $\mu = 0$ oscillators in two oscillation states; currents generating positive action are marked by squares, currents of negative action are marked by circles.

currents are, as in the other figures, characterized by continuous and discontinuous lines for positive and negative currents. From the sign of the currents and their direction of circulation one can determine the sign of the action. For easy interpretation of the figure, the signs of the currents generating the action are additionally marked by squares for positive action and by circles for negative action. If one uses the formation of the action according to the already discussed pattern, in which the currents flow from a creator of the creator plane over the three directions in the cubes to the annihilator plane, then one obtains the following properties for the system of action generators in its two states:

Formation of the basic structure

Analysis of mass and charge oscillators, **Figure 7**:

- The mass and charge oscillators consist of a sequence of $\mu = 0$-unit-cubes; each cube is occupied with four activated $\mu = 0$ commutator correlations, of which two generate positive and two negative action. It is assumed that in the

rest frame, the positive and negative action in the overall system has the same amount (Hamilton principle).

- Four unit-cubes form a four-block, which consists of equal positive or negative currents. There is one type of four-blocks associated with positive and one type associated with negative currents. Positive and negative four-blocks are each superimposed with two unit-cubes. The two different four-blocks play an important role in the interaction between static photons and gravitons with the basic structure; the two different four-blocks are depicted in Figure 8 in their two oscillation states.
- In each cube, two equal circulating currents with the same signs occupy a vertical plane; two planes with opposite direction of circulation and opposite sign of the current lie opposite in each cube.
- The vertical planes with purely positive and purely negative currents form a continuous current in the creator- and in the annihilator plane; the currents in the two planes have the same sign and are directed in opposite directions. Two rows of these planes with positive or negative direction and equal signs of the current are opposite.
- The system with fully occupied $\mu = 0$ cubes has two oscillation states, which differ in the direction of current, with the same sign of the current and generate opposite signs of action for each state in each cube.

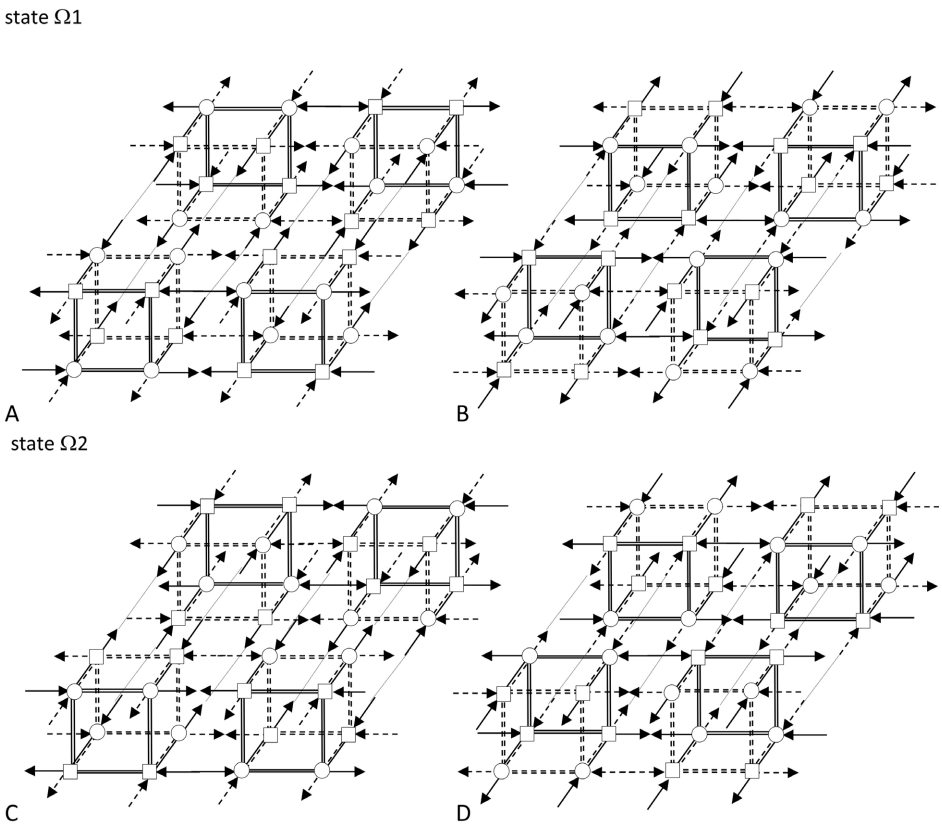


Figure 8. Spatial representation of two different four-blocks in basic structure in two oscillation states.

- If both states are superimposed with their adjacent surfaces (e.g., the creator plane with the annihilator plane, as the two adjacent planes), then positive sources are also superimposed with positive sources and negative sources with negative sources of the cube. This means that, on the one hand, the currents of different states overlap constructively and that the signs of the action "at the corners" of the cubes are preserved. On the other hand, the currents in both states have different directions of circulation, but the same signs, and cancel each other out.
- If the creator and annihilator lie on top of each other, the current-carrying vertical correlations point in the opposite direction in each state.
- The system of action generators consists of unit-cubes with four commutators; O and X oscillators are mounted opposite each other and have different signs of action. The two O-X-oscillators in each unit-cube have different properties, which will be discussed in the following sections. We will call these two O-X-oscillators as active- and as not active-O-X-oscillators.
- The basic structure can be considered as consisting of two into each other introduced structures: a structure which has all O-X-commutator correlations placed at the same position at the unit-cubes, as the photons of Maxwell fields and gravitons and a structure which O-X-commutator correlations are placed to that at opposite direction. The first one we call the active-O-X-oscillators, and the other not-active O-X-oscillators.
- Each four-block contains four unit-cubes and in each unit-cube four vertical correlations are present; two of them are directed up and two down. When the vertical correlations are directed up for the active O-X-oscillators in the static photons and gravitons, the vertical correlations of the not-active O-X-oscillators are directed down. In each four-block eight vertical correlations are directed up and eight are directed down. Each four-block is overlapped by four four-blocks related to the active O-X-oscillators and by four not-active four-blocks.

In the following, we want to show that this system of charge- and mass-oscillators describes both the interaction with the positive and negative photons of the static Maxwell fields, with their wave and particle properties, as well as the gravitons with the mass oscillators. Because of this property, we want to call the structure shown in **Figure 7**, **Figure 8** and **Figure 10** the basic structure. This interaction also proves to be consistent with the interaction between scalar oscillators and the photons of static Maxwell fields already described in [13].

4.2. Further Structures of $\mu = 0$ Oscillator Systems

In addition to the basic structure in **Figure 7**, further systems of $\mu = 0$ oscillators can be formed, whose sum of the action is extinguished. One of these structures is shown in **Figure 9**. The structure is generated by O and X oscillators of the deactivated virtual vacuum. This structure also forms four-blocks; the currents in the vertical planes are extinguished. However, there are continuous currents

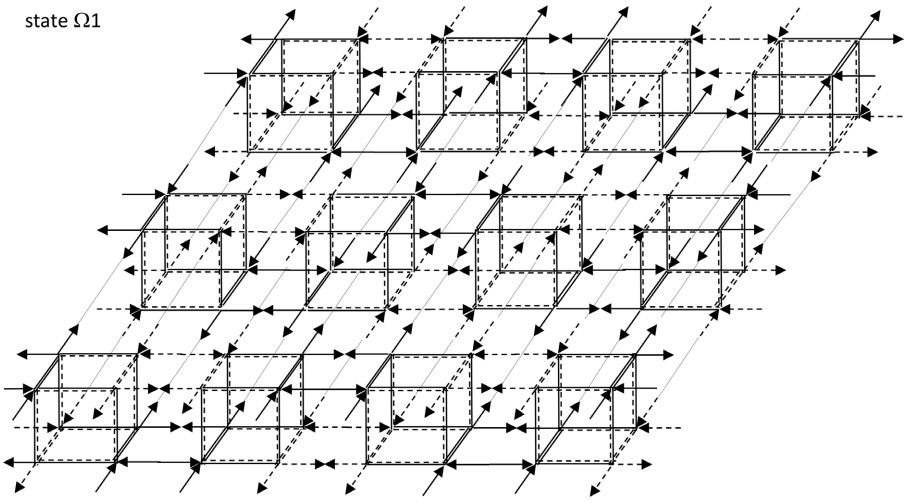


Figure 9. Spatial representation of currents in a correlation structure, constructed with four-blocks, generated by two O-X-oscillators with deactivated virtual action.

of the same sign that run through the entire structure, similar to the structure in **Figure 7** (but of orthogonal direction in comparison to **Figure 7**).

Another interesting structures are obtained from structure in **Figure 7**, if we remove from these structures either the O-X-active part or of the O-X-not active part, so that the structures obtain the properties of static photons, but consisting only of a number of $\mu = 0$ oscillators. These structures have a movement property, because only one pair of vertical correlations in one direction is active. We will call these structures up- and down structures. The structures oscillate in two states between the sign of currents, that is also the sign of action. The oscillation will be similar as that between A and B or C and D of **Figure 8**. While they contain only virtual action and they fulfill the conditions of the Hamilton principle, their surface is active, similar as the basic structure. These structures are able to interact with the basic structure.

4.3. Extension of the Basic Structure

Gravitons and the photons of the deactivated vacuum have the same structure and can be considered to be overlapped forming the structure of the Maxwell vacuum. Similar the basic structure of **Figure 7** and the structure of **Figure 9** formed by the oscillators of the deactivated virtual action can superimpose, forming a common structure of high symmetry. The structure in **Figure 10** resulting from the superposition of the basic structure (**Figure 7**) with the structure formed from the deactivated currents (**Figure 9**) differs from the basic structure in that all twelve correlations are activated in the cubes, while in the basic structure only eight correlations are activated and four are deactivated by superposition of positive and negative currents.

In order to distinguish the currents between different creator- and annihilator-pairs, we choose in **Figure 10** stark and weakly continuous and discontinuous lines and arrows and have removed additional currents for a better visualization

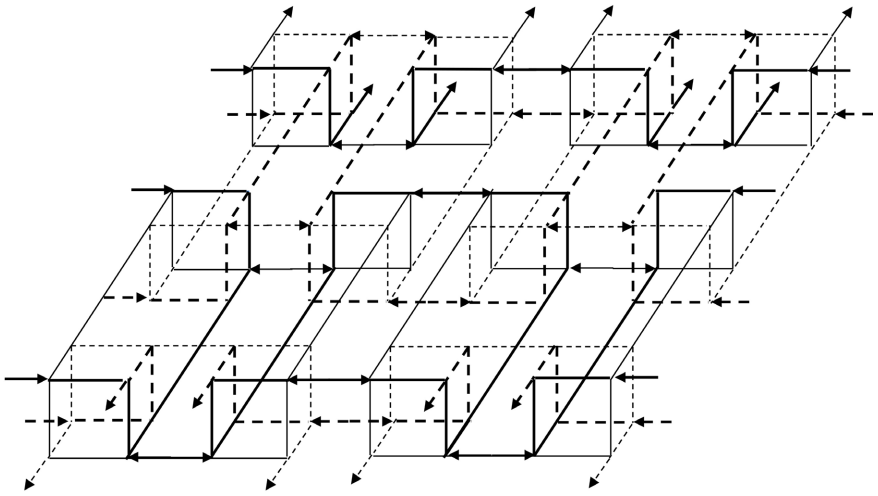


Figure 10. Spatial representation of the formation of a symmetric structure by overlap of the basic structure, **Figure 7**, with the structure obtained from deactivated virtual unit cubes, **Figure 9**. For each four block only one of the two currents is depicted.

of the four-block currents. Each four-block consists of two sets of positive and negative currents generated by a positive/negative pair of the components of the vector potential $+A_0/-A_0$. As a result, all cubes are uniformly activated by six positive and six negative currents. Each cube thus contains a positive current in both vertical opposite directions and negative currents in both vertical opposite directions. The current between creator and annihilator plane becomes visible from the direction of the correlations. Each cube consists of a superposition of currents from all four adjacent four-blocks. Based on the Hamilton principle, these structures have uniform currents; they form an entangled system [17]. **Figure 10** can be divided into four four-blocks, which are superimposed between each other. Two of the four-blocks are formed with positive currents connecting the four unity cubes and two of them are formed with negative currents. A four-block with positive currents and a four block with negative currents are formed by active O-X-pairs and a positive and a negative four-block are formed by the not-active O-X-pairs. This is demonstrated in **Figure 11**, which shows how a unit cube is connected with four four-blocks, two active and two not active.

In the center in **Figure 11** a unit cube is considered. The currents of the two O-X-pairs are generating the currents for the neighbor four-blocks. Two four-blocks a positive and a negative four-block—marked by thick lines—form vertical correlations at the corners directed down and two four-blocks one positive and one negative—marked by thin lines—form vertical correlations which are directed up. For photons and gravitons, interacting with the basic structure, the vertical correlations directed down are generating the active O-X-pairs directed up and the vertical correlations directed down then are forming the not active O-X-pairs. The photons of static Maxwell fields are in both states connected to the basic structure with their vertical correlations in opposite direction to the

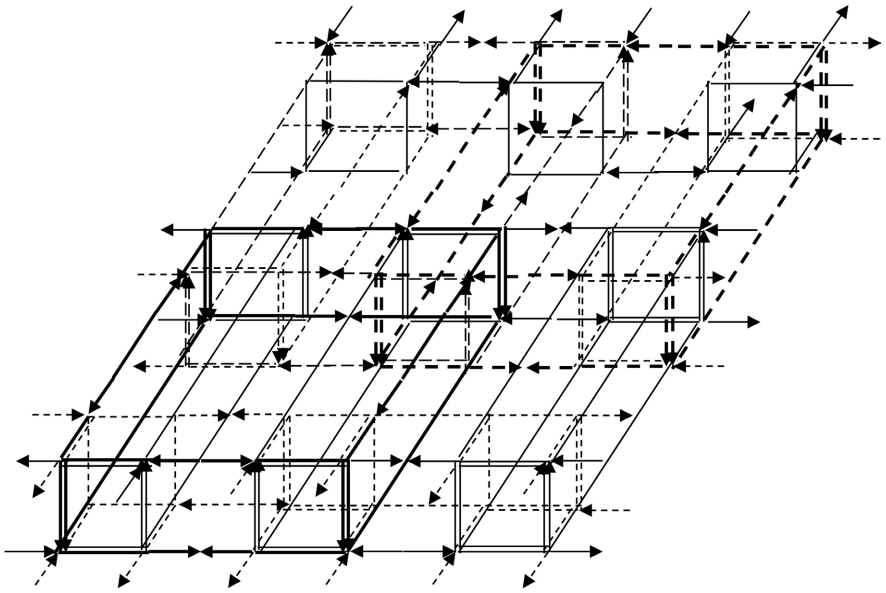


Figure 11. Each unit cube in the basic structure is with its commutator correlations connected with a positive and a negative four block, which vertical correlations are directed from the creator plane to the annihilator plane in down direction, and with a negative and a positive four-block which vertical correlations are directed up. In this spatial representation the four blocks directed down are marked by stark lines and the four blocks with vertical correlations directed up are marked by weakly lines. In the following oscillation state all currents change the direction, while the current signs remain the same.

vertical correlations of the basic structure. This distinguishes the active part from the not active part of basic structure. As will be discussed the two four-blocks with active O-X-pairs are connected with the static photons of positive and negative charge and with gravitons, while the two four-blocks with not-active O-X-pairs forms the memories of charges and of the mass.

5. Interaction of Static Photons and Gravitons with the Basic Structure

In previous sections it was demonstrated that the currents in oscillators of the photons of static Maxwell fields are forming four-blocks with different properties. A structure for the oscillators of the charges and masses is proposed, which also can be characterized by four-blocks. In the following section it is discussed, how the four-blocks of the static photons and the four-blocks of gravitons are interacting with the four-blocks of the basic structure.

The basic principle of the interaction between the structures of static photons and the basic structure is the transmission of information under the conditions of Hamilton's principle. Information is transferred from the basic structure to the static photons, which minimizes the action on the surface of the basic structure. Information is transferred from the static photons to the basic structure when information is absorbed as a result of the interaction in the photon cloud. These deltas of information (four-blocks) are transferred to the basic structure in such a way that the action is minimized after taking a rest frame.

The exchange of information in both directions takes place under the following conditions: 1) The surface of the basic structure is always activated by currents of action as follows: In Ω1 the currents in A are positive, in B negative, in Ω2 the currents in C are positive and in D are negative. The interaction always takes place simultaneously in A and B, or in C and D. 2) The currents of the plane facing the surface of the basic structure are a) positive and negative in the case of static photons with wave properties, b) in the case of particle properties in the exchange state, the currents are extinguished, and c) in the particle state, they are positive and negative. d) In the case of gravitons, the currents are extinguished. 3) If the currents in the lower plane of the photons are deleted, then information is transferred from the basic structure to the photons. The transmitted information has different effects in the upper level: if the upper level is different from zero, then the information becomes effective in a vacuum with its sign, if it is equal to zero, then it is ineffective.

This leads to the following statements:

- In the case of gravitons within the structure before an interaction, all currents are extinguished. Either virtual action is transferred to the structure, or the transmitted action is erased by superimposing the currents of the basic structure and gravitons.
- In the case of wave properties, both positive and negative currents are transferred from the basic structure to the static photons, one of which is deleted. The deletion then takes place differently in A and B, or in C and D.
- In the case of particle properties in the exchange state, all currents are deleted, so information is transferred to the static photons, but this is deleted by superposition of commutator and spin correlations.
- In the particle properties in the particle state, the currents in the lower plane are both positive and negative. As a result, one of the currents is deleted, and information is transferred to the others. The transmitted information forms the real action and the electric fields in the photon cloud.

The statements compiled here are discussed in detail below[5].

5.1. Assumptions to Describe the Interaction between Static Photons and the Charge- and Mass-Oscillators

To describe the interaction between the photons of static Maxwell fields or the gravitons with the charge oscillators or with the mass oscillators (*i.e.*, the basic structure **Figure 7**), we make the following assumptions:

- The interaction takes place by superimposing the lower plane of the photons and the upper plane of the charge or mass oscillators whenever the currents in the superimposed planes are parallel and equally directed. Due to the structure of the photons and charge oscillators, positive and negative currents are always superimposed, which corresponds to the conditions of the Hamilton principle.

[5]The presented model of the interaction between static photons or gravitons and the basic structure should only be an approximation of the continuous transition that probably actually takes place.

- The overlapping currents are added if they have the same signs and subtracted if their currents have different signs. We assume that in the rest frame the currents have equal amounts.
- In the photons of the static Maxwell fields, creators or annihilators with different signs overlap in some places. These points are the output of currents with different signs, which annihilate each other in a rest frame.
- The interaction always takes place between the central four-block of the Maxwell photons and the four-blocks of the basic structure A and B or C and D.

The interaction of the static photons with the charge oscillators takes place according to the same principle as in the propagation of the wave in vacuum, in that on the basis of the Hamilton principle a forming state of the photon in the vacuum simultaneously forms the correlation structure of the following state and in the following oscillation state the currents flow into the newly formed state [5] [17]. According to this model of the propagation of a photon wave in vacuum, the formation of the state of the static photon, following the surface of the charge oscillator, takes place by coinciding its creator plane with the annihilator plane of the charge oscillator. The link between the lower plane of the static photon and the upper plane of the charge oscillator is based on minimizing the action and thus describes the interaction between both types of oscillators.

However, compared to the mechanism of propagation of a wave in a vacuum, there is a special feature: The charge oscillator consists of only $\mu = 0$-unit-cubes, which are linked to each other, like the Maxwell photons, by forming four-blocks. The static photons, on the other hand, have a central four-block in which the four $\mu = 0, 1, 2, 3$ unit-cubes are housed and another four four-blocks that are formed by the E_i- and B_i-fields. From the point of view of the PIT (see discussion), the static photons are formed by an interaction of the units of action in the form of cubes or four-blocks with a contribution of space-time. By interaction of the static photons with the surface of the charge oscillators, they form stable elementary particles, because they then satisfy the Hamilton principle. We therefore assume that the interaction of the static photons with the charge oscillators takes place only via the central four-block of the photons. This issue will be examined below on the basis of the proposed structure of charge oscillators, **Figure 7**.

The information in the form of a four-dimensional delta of the action formed during the interaction in the photon cloud must be transferred into the structure of the charge- and mass-oscillators. The absorption of the information in the charge oscillator is carried out on the basis of the conditions of the Hamilton principle by forming an equilibrium of the action between the content in absorption and in the photon cloud. We always assume that after the information from the photon cloud is introduced into the charge oscillators, an equilibrium finally arises, which consists in the fact that the same information (the μ-components of the four-dimensional delta) is contained in the photon cloud and in the charge oscillators. The information initially absorbed in the photon

cloud is introduced into the charge oscillators on the basis of the Hamilton principle [13].

5.2. Interaction between the Static Photons with Wave Properties and the Charge Oscillators

We assume that the lower planes of the static photons with wave properties, Figure 2, are applied to the upper plane of the charge oscillators in such a way that the currents in both planes have the same direction. Then there is the interaction between the upper planes of state Ω1 of the charge oscillators, Figure 8, with the lower planes of photons, namely $W1_{\beta}$ and $W2_{\alpha}$ in (A) and (B) and the interaction of the states of photons $W1_{\alpha}$ and $W2_{\beta}$ in (C) and (D). The assignment of $W1_{\alpha}$ and $W2_{\beta}$ in (A) and (B) as well as $W1_{\alpha}$ and $W2_{\beta}$ in (C) and (D) is based on the criterion that the action is minimized in the photons of the photon cloud. The interaction between the static photons with wave properties is different for the two parts A and B in Ω1 and for C and D in Ω2. The results are summarized in Table 3.

Table 1 describes the activation of static photons with wave properties without considering the interaction of the photons with the basic structure. The two photons $W1_{\beta}$ and $W2_{\alpha}$ as well as the two photons $W1_{\alpha}$ and $W2_{\beta}$ have parallel and the same direction of currents. Table 3 shows the result of interaction of these photons with the basic structure. The single photons now interact with both structures A and B and in the following oscillation state with C and D of the basic structure. If we want to compare both results we must add the results of the two interactions A and B in state Ω1 and similar for the following state Ω2 in C and D. Adding the results of Table 3 for example for the photon $W1_{\beta}$ the same results are obtained for the O and X oscillators in $\mu = 0$ and for the O-oscillator in $\mu = 3$ as in Table 1. An disagreement results for the X-oscillator in $\mu = 3$. In the photons without an interaction with the basic structure the currents in the

Table 3. Sign of action in μ-cubes and in four-blocks for wave properties of static photons after interaction with the basic structure. ("+" positive action, "−" negative action, "0" action deleted, "±" and "∓" positive and negative currents).

	O	X	O	X	O	X	four-block		
	$\mu = 0$	$\mu = 0$	$\mu = 3$	$\mu = 3$	$\mu = 1, 2$	$\mu = 1, 2$	$\mu = 0$	$\mu = 3$	$\mu = 1, 2$
$W1_{\beta}$-A	+	0	0	0	0	0	∓	+	0
$W1_{\beta}$-B	0	+	+	−	0	0	∓	+	0
$W2_{\alpha}$-A	0	−	0	0	0	0	±	+	0
$W2_{\alpha}$-B	−	0	+	−	0	0	±	+	0
$W1_{\alpha}$-C	0	+	+	−	0	0	±	−	0
$W1_{\alpha}$-D	+	0	0	0	0	0	±	−	0
$W2_{\beta}$-C	−	0	+	−	0	0	∓	−	0
$W2_{\beta}$-D	0	−	0	0	0	0	∓	−	0

X-μ = 3 oscillator are deleted. But overlapping this correlation with the currents of the basic structure the oscillator will be activated. The same comparison can be performed with the other photons $W2_{\alpha}$, $W1_{\alpha}$ and $W2_{\beta}$, which shows that there is an agreement between the activation in the static photons with wave properties with and without an interaction with the basic structure, when the transfer of currents in the X-μ = 3 oscillator of the photon by the basic structure is applied.

Conclusions: In wave properties the basic structure supplies the static photons with action. Under formation of three dimensional structures of the static photons, action is minimized in wave properties. From the interaction of the longitudinal parts of the photons with the unit-cubes of the basic structure, equal amounts of positive and negative action are always transferred to the two photons O and X in the rest frame.

→ The state $W1_{\alpha}$ & $W2_{\beta}$ is formed by the state Ω2, and $W1_{\beta}$ & $W2_{\alpha}$ by the state Ω1 of the basic structure. The superposition of the states $W1_{\alpha}$ & $W2_{\beta}$ and $W1_{\beta}$ & $W2_{\alpha}$ describes the interference of the matter waves.

→ The charge oscillators oscillate together with the static photons of the photon cloud.

→ The wave properties of matter waves are a consequence of Hamilton's principle; by forming the photons with wave properties, the action in the photons is minimized.

This assignment between static photons and the basic structure is unique with regard to the minimization of the action: The state Ω1 of the basic structure interact with the photons $W1_{\beta}$ & $W2_{\alpha}$ and in state Ω2 with the photons $W1_{\alpha}$ & $W2_{\beta}$. The two photons in $W1_{\beta}$ & $W2_{\alpha}$ of Ω1 as well as the two photons in $W1_{\alpha}$ & $W2_{\beta}$ of Ω2 each have opposite signs of action in the longitudinal oscillators and cancel each other out. The assignment of static photons with wave properties used here is unambiguous, because the interaction between static photons and charge oscillators is based on rectified currents and because only the selected assignment of the states of the photons to the two four-blocks causes a minimization of the action. By interaction of the charge oscillators with the static Maxwell photons, the action of the object, consisting of charge oscillators and of static photons with wave properties, is erased between commutator- and spin-correlations in the static photons within the conditions of the Hamilton principle.

If a charge oscillator defined only on the correlation space is introduced into space-time, then the conditions of the Hamilton principle cause the formation of static photons with wave properties.

5.3. Interaction between the Static Photons with Particle Properties and the Charge Oscillators

The evaluation of currents for the interaction of static photons with particle properties, **Figure 3**, with the basic structure **Figure 7** or **Figure 8** is summarized in **Table 4**. **Table 4** leads to the following statements:

Table 4. Results of interaction of the static photons with particle properties with the basic structure. ("+" positive action, "−" negative action, "0" action deleted).

Exchange state: Particle; state Z1						Anti-Particle; state Z2			
	$\mu = 0$	$\mu = 0$	$\mu = 3$	$\mu = 3$		$\mu = 0$	$\mu = 0$	$\mu = 3$	$\mu = 3$
	O	X	O	X		O	X	O	X
C	0	+	+	0	C	−	0	0	−
D	+	0	0	+	D	0	−	−	0
Particle state: Particle; state Z2						Anti-Particle; state Z1			
	$\mu = 0$	$\mu = 0$	$\mu = 3$	$\mu = 3$		$\mu = 0$	$\mu = 0$	$\mu = 3$	$\mu = 3$
	O	X	O	X		O	X	O	X
A	0	−	0	+	A	0	+	0	−
B	−	0	+	0	B	+	0	−	0

Exchange state: The exchange state of the static photons with particle properties is, as discussed in Section 3.2, completely erased by superposition between the commutator correlations and the spin correlations.

- The exchange state of the particle Z1 can interact with the structure C or D of the charge oscillators; in both cases, rectified currents that connect the cubes in the four-block overlap; the currents are deleted and are superimposed with different signs in C and D.
- The exchange state of the anti-particle Z2 can interact with both the structure C or D of the charge oscillators; in both cases, rectified currents that connect the cubes in the four-block overlap; the currents are deleted and are superimposed with different signs in C and D.

Particle state: In the particle state, particles and anti-particles each have different signs of action in the longitudinal oscillators and among each other. Due to the orientation of the currents, they are always in interaction with both charge oscillators, **Figure 8**, in their state Ω1, *i.e.*, with A and B.

- In the static photon of the particle, the particle state Z2 in the $\mu = 0$ oscillator in both oscillators O and X is negative and the $\mu = 3$ oscillator is positive in both oscillators O and X. The interaction takes place with the four-blocks A and B. **The four-blocks A and B and the associated exchange states C and D together with the static photon of the particle in state Z2 are thus responsible for the positive charge of the particle.**
- In the static photon of the anti-particle, the particle state Z1 in the $\mu = 0$ oscillator in both oscillators O and X is positive and the $\mu = 3$ oscillator is negative in both oscillators O and X. The interaction takes place with the four-blocks A and B. **The four-blocks A and B and the corresponding exchange states C and D together with the static photon of the anti-particle in state Z1 are thus responsible for the negative charge of the anti-particle.**

- The activation of the longitudinal oscillators and their adjacent peripheral four-blocks determine the properties of the electric fields [10].

In particle state from basic structure negative information of action in $\mu = 3$ and positive in $\mu = 0$ oscillator is submitted to the oscillators in the photon cloud of the anti-particle and positive information of action in the $\mu = 3$ and negative in $\mu = 0$ of the particle.

For the interpretation of interaction between the static photons and the basic structure in particle properties again the superposition of the two photons from the parts A and B as well as from C and D must be considered. The exchange state after an interaction with the basic structure show that in particle and in anti-particle the same sign of action is supplied to the static photons—for particle positive and for anti-particle negative—as is contained in the photons without interaction with the basic structure. The currents from the basic structure are all deleted in the exchange state of the static photons by the currents of the spin correlations. In particle state of particle properties a similar problem arise, now with the O-$\mu = 3$ oscillator, as in wave properties with the X-$\mu = 3$ oscillator: in the static photons one of the currents forming action is deleted, but by overlapping the currents of the basic structure the currents are activated in the static photon.

Conclusions:

From the comparison of the activation of the static photons with and without an interaction with the basic structure follows that the static photons are supplied with action from the basic structure. This occurs under conditions of the principle of Hamilton. The different signs of charges of particle and anti-particle are a consequence of the different oscillation states in which particle and anti-particle interact with the basic structure. The different signs of the action in both longitudinal oscillators with particle properties are comparable to the different signs of the action in both oscillatory states of the photons of light and correspond to a reduction of the action.

5.4. Interaction between Gravitons and Mass Oscillators

The gravitons were obtained by activating the O and X oscillators in all four μ-commutators in the cubes and selecting the signs of the action for O and X differently. After changing the state, the signs are inverted. This results in two gravitons with the following states, **Figure 5**:

$G1_{\alpha}$: $\mu = 0$ O(+)-X(−), $\mu = 3$ O(−)-X(+), $\mu = 1, 2$ O(−)-X(+),

$G2_{\alpha}$: $\mu = 0$ O(−)-X(+). $\mu = 3$ O(+)-X(−), $\mu = 1, 2$ O(+)-X(−),

$G1_{\beta}$: $\mu = 0$ O(−)-X(+), $\mu = 3$ O(+)-X(−), $\mu = 1, 2$ O(+)-X(−),

$G2_{\beta}$: $\mu = 0$ O(+)-X(−). $\mu = 3$ O(−)-X(+), $\mu = 1, 2$ O(−)-X(+),

The action in gravitons is completely deleted by the currents between commutator and spin correlations. Under interaction of gravitons with the basic structure the signs of action which are introduced into gravitons after interaction with the basic structure are shown in **Table 5**.

Table 5. Submission of information from the basic structure to the structure of gravitons. ("+" positive action, "−" negative action, "0" action deleted).

	$\mu=0$	$\mu=0$	$\mu=3$	$\mu=3$		$\mu=0$	$\mu=0$	$\mu=3$	$\mu=3$
$G1_{\beta}$	O	X	O	X	$G1_{\alpha}$	O	X	O	X
G1-A	0	0	0	0	G1-C	0	0	0	0
G1-B	−	+	+	−	G1-D	+	−	−	+
	$\mu=0$	$\mu=0$	$\mu=3$	$\mu=3$		$\mu=0$	$\mu=0$	$\mu=3$	$\mu=3$
$G2_{\alpha}$	O	X	O	X	$G2_{\beta}$	O	X	O	X
G2-A	+	−	−	+	G2-C	−	+	+	−
G2-B	0	0	0	0	G2-D	0	0	0	0

Similar as for the static photons the gravitons superimpose with the same circulation directions of the currents in A and B and in C and D. After superposition of the contributions A and B, as well as C and D the following gravitons are formed: $G1_{\beta}$ & $G2_{\alpha}$ interacting with A and B of basic structure and $G1_{\alpha}$ & $G2_{\beta}$ interacting with C and D. This results in:

Ω1: $G1_{\beta}$ & $G2_{\alpha}$

interacting with A forming the signs: +−−+

interacting with B forming the signs: −++−

similar for Ω2: $G1_{\alpha}$ & $G2_{\beta}$

interacting with C forming the signs: −++−

interacting with D forming the signs: +−−+

The signs are signs of the gravitons generated by the basic structure in longitudinal oscillators. In both states Ω1 and Ω2 interaction between the basic structure and the gravitons occurs. In each state the action is annihilated between O and X and between $\mu=0$ and $\mu=3$. There is no information submitted from the basic structure to the gravitons when the interaction occurs for $G1_{\beta}$-A, $G2_{\alpha}$-B, $G1_{\alpha}$-C and $G2_{\beta}$-D. In this case the overlapping sources of action have different signs and cancel each other. In the photon cloud active are only:

In Ω1: $G1_{\beta}$-B, $G2_{\alpha}$-A and in Ω2: $G1_{\alpha}$-D and $G2_{\beta}$-C.

The interaction of the gravitons with the basic structure occurs with the active O-X-oscillators of basic structure. For the four interacting gravitons that results in Ω1 for $G1_{\beta}$-B interacts with positive currents in basic structure and $G2_{\alpha}$-A with the negative currents. In Ω2 the $G1_{\alpha}$-D interacts with positive currents and $G2_{\beta}$-C with negative currents of the basic structure. In both states of the basic structure the gravitons interact with the positive and negative currents. As follows from **Figure 10** there are always two four-blocks for positive and for two negative currents. Two of them—a positive and a negative—are active and are interacting with the gravitons and two of them—a positive and a negative—are not-active and are forming the mass of the basic structure.

5.5. Comparison of the Properties of Static Photons and Gravitons after Interaction with the Basic Structure

The analysis of the correlation structures of the photons with wave properties

after interaction with the basic structure yields the following statements: the two photons $W1_{\beta}$ & $W2_{\alpha}$ and $W1_{\alpha}$ & $W2_{\beta}$ are each deleted in $\mu = 0$, separately for O and X and in $\mu = 3$ the oscillators O and X are deleted with different signs. $W1_{\beta}$ & $W2_{\alpha}$ and $W1_{\alpha}$ & $W2_{\beta}$ differ from each other in the sign in the $\mu = 3$ four-block. It follows that, on the one hand, the formation of the two photons $W1_{\beta}$ & $W2_{\alpha}$ and $W1_{\alpha}$ & $W2_{\beta}$ satisfies the Hamiltonian principle and, on the other hand, that they interfere via the four-block $\mu = 3$. For the individual photons, the longitudinal oscillators correspond to the photons of light; they describe the progress in space-time. The difference between photons of light and the matter wave is that the matter wave, in addition to the photons, drags the basic structure behind it and therefore cannot reach the speed of light. This has been already discussed in [6].

In the case of wave properties, the cubes of the static photons are supplied by the information of the cubes of the basic structure; the information transmitted by the basic structure is found in the static photons with wave properties. In the case of the particle properties in the exchange state, the currents cancel out in the static photons between the commutator and spin correlations, but positive action is transferred from the basic structure to the exchange state of the particle in all four longitudinal oscillators and negative action is transmitted to the anti-particle. The transmitted action does not appear in the exchange state, as in the wave properties, because in the exchange state in the lower plane of the static photons, which lies on the upper plane of the basic structure, the currents between the commutator and spin correlations are erased. The positive action on the particle and the negative action on the anti-particle is transferred by the currents to the lower "empty" plane of the photons and erased by the superposition between the commutator and spin correlations in the upper plane. In the case of wave properties, on the other hand, the currents of the longitudinal four-blocks are not extinguished and the information can be transferred from the basic structure to the static photons. The transverse oscillators are erased in the wave properties in both planes, so that the information transferred from the basic structure to it is deleted. The information transmitted by interaction to the transverse oscillators is deleted within the transverse four-blocks. Therefore, information transmitted to the transverse oscillators and to four-blocks causes a change in the direction of movement only during the interaction.

In the case of particle properties in the particle state, the transverse oscillators and the associated four-blocks are deactivated, so they behave analogously to the transverse oscillators in wave properties. The longitudinal ones, on the other hand, are activated, namely in $\mu = 0$ negative in the particle and positive in $\mu = 3$ and in the anti-particle in $\mu = 0$ positive and in $\mu = 3$ negative. This information is transferred into the photon from the basic structure via the activated longitudinal oscillators and the associated four-blocks and appears in the photon cloud.

As discussed in part 3.5, in the correlation structures of gravitons, all currents between the commutator and spin correlations are deleted. Due to the interaction with the basic structure, in one graviton action remains erased and the other

contains virtual action in the longitudinal oscillators, in that one of the oscillators O or X is positive and the other X or O is negative. The sign also changes between the two longitudinal oscillators. One can either look at the individual gravitons in superposition, as was done with static photons, or individually. In superposition, the signs (−++−) result in the longitudinal oscillators for $G1_{\beta}$ in A and B as a virtually activated graviton. For the pair $G2_{\alpha}$ in A and B, the activated graviton is in the form (+−−+), for $G1_{\alpha}$ in C and D the sign combination (+−−+), and for $G2_{\beta}$ the combination (−++−) follows in C and D. The superposition of the gravitons in states Ω1 or Ω2 leads to the cancellation of all real currents. If we look at the gravitons individually, then they contain one with activated virtual action and one in which all currents are extinguished in each state. In analogy to the static photons with particle properties, we can consider the gravitons with virtual action as particle states and those with the extinguished currents as exchange states. In this case, both states—the exchange state with extinguished currents and the particle state with activated virtual action—are formed simultaneously in each oscillation state, similar as in the case of magnetic photons [4].

In summary, the formation of static photons and gravitons occurs by transferring the information of the basic structure to the correlation structure of photons under the conditions of the Hamiltonian principle. Under conditions of the Hamilton principle the information generated in the photon cloud by an interaction is transferred in exchange state from the static photons to the basic structure. If one considers only the wave properties of the static photons, then they arise due to the interaction of the surface of the basic structure under the conditions of the Hamiltonian principle with the Maxwell vacuum. The particle properties are then caused by perturbation as a result of an in-elastic interaction. In the case of gravitons, a distinction must be made between their formation from the basic structure and their presence in the Maxwell vacuum.

5.6. Interaction of Maxwell Photons with Maxwell Vacuum

The interaction of the Maxwell photons of light and the photons of the static Maxwell fields with the Maxwell vacuum, consisting of deactivated vacuum and gravitons, has already been investigated elsewhere using $\mu = 0$ unit-cubes [5] [17]. In this report, this interaction is briefly supplemented by one that takes place between the central four-blocks. All we need to do, is to consider the superposition of the currents of Maxwell photons, e.g., the light from **Figure 6** and the vacuum from **Figure 4**. **Figure 12** shows the structure of the elliptically polarized photon embedded in the structure $V1_{\beta}$ of the vacuum. In this case, the direction of motion of both photons is directed in opposite directions. The superposition of the photons leads to entanglement with the formation of common currents. **Figure 12** shows how the photon of light fits into the structure of the static vacuum.

These considerations should show that the deactivated virtual vacuum together with the gravitons not only superimposes the Maxwell photons, but is also the

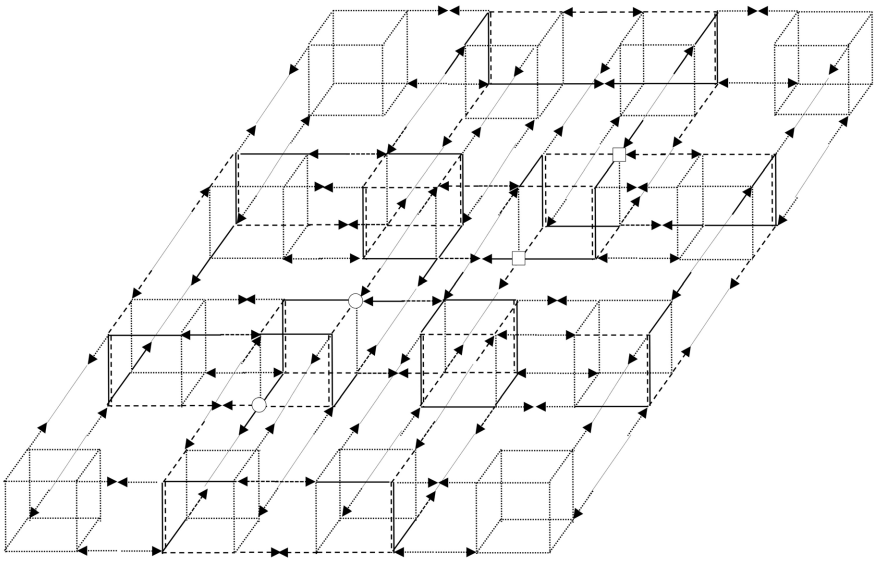


Figure 12. Spatial representation of currents in a photon of light (**Figure 6**) embedded in the structure of the vacuum (**Figure 4**).

basis of superposition, induction and entanglement. It thus explains entanglement and light propagation [17].

6. Summary and Discussion

The photons of Maxwell's static fields, the photons of light, the magnetic photons, the photons of vacuum, and the proposed basic structure for charge and mass oscillators are formed from four-blocks units consisting of four unit-cubes and overlapping into one or two unit-cubes. The unit-cubes in the four-blocks are linked together by two currents. The formation of the four-blocks basically follows from the structure of the unit-cubes forming the action, whose currents between creator and annihilator are formed by correlations of the derivatives of the vector components, which always have the same three perpendicular directions. Five of the four-blocks form the static photons and gravitons, four the photons of light and a large number the basic structure of the oscillators of matter and charges. The four-blocks are contained in all elements of nature and are exchanged as information in an interaction. There are always the four-blocks that interact and whose contents are exchanged between interaction partners and stored in interaction partners.

In wave properties interference occurs between the states $W1_{\beta}$ & $W2_{\alpha}$ and $W1_{\alpha}$ & $W2_{\beta}$. The wave propagation in vacuum occurs by induction [12]. Static photons with particle properties arise from the static photons with wave properties as a result of an interaction with exchange of real action. Static photons exist in two forms: as such for particles and as such for anti-particles. There are two gravitons O(+)-X(−) and O(−)-X(+), which oscillate with changes in correlation directions and thus with changes in sign of action. The action in gravitons is activated virtually; in a single interaction the gravitons are information carriers of

the real action, and in a gradient of gravitation the information is virtual [5]. Photons of light are formed from four superimposed four-blocks, they have only currents from commutator correlations and have no spin correlation currents. In the photons of light, only the longitudinal oscillators are activated, the transverse oscillators are formed by deactivated currents, as in the deactivated vacuum. The Maxwell vacuum consists of the superposition of the gravitons with the deactivated virtual Maxwell vacuum. In the deactivated virtual vacuum, all four commutators in the O and X photons are erased by currents with different signs and the same direction of circulation. The deactivated virtual vacuum is the carrier of information by superimposing all fields of elementary objects.

Since the four μ-unit-cubes of the deactivated virtual vacuum form carriers of deactivated virtual action, in a rest frame they are simultaneously separated from each other and therefore independent of each other. In static photons and in gravitons the independence of the four coordinates follows from the overlap of commutator- and spin-correlation currents with opposite signs between the unity cubes in the central four-block.

The structure of charge and mass oscillators is postulated under the assumption that they simulate the field-field correlations given in the scalar oscillators, which describe the mass and charge, in interaction with the static photons and gravitons [6]. We call it the basic structure because it interacts equally in the static photons for both signs of the charges and in their particles and wave properties, as well as with gravitons. In addition, the basic structure describes the mass of objects by the not active O-X-oscillators. The basic structure consists of a combination of $\mu = 0$ unit-cubes, which are fully occupied by four commutators and which are linked to each other by correlations. The unit-cubes in the basic structure form two types of four-blocks, whose four unit-cubes are connected to each other by positive or negative currents and which oscillate in two states. The two types of four-blocks are connected to each other in the basic structure by overlapping with two unit-cubes. Within the unit cubes, the active O-X oscillators and the non-active O-X oscillators are distinguished; O- and X-oscillators each have the same amount and different signs of action.

The interaction of static photons and gravitons with the basic structure occurs by superimposing the lower plane of the correlation structure of the static photons with the upper plane of the basic structure. The superposition occurs under conditions of the Hamilton principle when parallel currents in the overlapping planes have the same direction. This interaction leads in the rest frame to an equilibrium of the action in absorption in the basic structure and in the photon cloud.

In gravitons, in wave properties and in particle state of particle properties of the static photons, the information is transferred from the basic structure to the static photons, giving them the properties discussed. In the exchange state, information is transported from the static photons to the basic structure after an interaction in the photon cloud. In [6] it was shown that a $\mu = 0$ oscillator formed from two O-X photons can simulate the behavior of masses in the

non-relativistic and relativistic ranges. Transferred to the basic structure, we assume that in each of the unit cubes with two O-X oscillators there is an O-X pair that interacts with the static photons and another O-X pair that contains a fixed, unchangeable portion of the action which represents the action of the mass or the charge.

The proposed model for the basic structure of masses and charges and their interaction with gravitons is consistent with the idea of General Relativity, according to which gravity is caused by a curvature of space; the curvature of space is caused by the masses present in space. In the PIT model, the strength of gravity depends on the density of the activated virtual action in gravitons and this also determines the curvature of space-time.

The basic structure consists of unit-cubes containing two O-X pairs with virtual action. These two O-X-pairs oscillate against each other because the active O-X pair has an opposite direction of propagation to the non-active O-X pair. The Maxwell photons, *i.e.*, the light and photons of the static fields and the Maxwell vacuum, on the other hand, each have only one active O-X pair whose vertical correlations point in the direction of motion. The active O-X pair forms a three-dimensional structure with four-dimensional fields on the correlation space. The active O-X pair initiates the formation and propagation of photons and gravitons at the speed of light on space-time. Masses and charges are formed by the Maxwell photons and by the gravitons together with the oscillators of the basic structure, whose motion in space-time is determined by the content of the action in equilibrium with the action in the photon cloud. Change of movement occurs under change of action; the change of action is an event in space time [18].

Based on the Lagrangian formalism and the communication relations of quantum mechanics, there are two different ways to describe the elementary objects of nature: The traditional way today is to derive by means of the Lagrangian density the equations of motion for the spatial-temporal behavior of the wave function. Assuming that the Lagrange density itself represent the object, in the PIT we have chosen the other way by obtaining correlations from the fields of the Lagrangian density and from the commutators of the communication relations via the Fourier transform and linking them together under the conditions of the Hamilton principle. The obtained representation of the elementary objects as correlation structures with oscillator properties correspond to the wave function of quantum mechanics and are characterized by the action generated by $\mu = 0$ oscillators, which are derived from commutators of communication relations.

If one analysis the behavior of the correlation structures of photons of the Maxwell fields, for electric-, magnetic-fields, light, gravitons and the Maxwell vacuum, then within the framework of this formalism all can be characterized by four-blocks, which consist of four unit-oscillators. In this report, we therefore propose a structure that describes the behavior of mass and charge oscillators consisting of $\mu = 0$ oscillators. We can show that this basic structure also consists

of four-blocks, interact with photons of static Maxwell fields and with gravitons forming their properties and thus determine the properties of elementary objects. In the context of this presentation, it follows that the four-blocks are elementary building blocks of nature from which all elementary objects consist and are exchanged as information between them when interacting. The four-blocks may therefore also have been basic elements of the prenatal cosmos.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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