

Why space is rigid

THE SOLUTION OF THE MYSTERY OF LICHT AND ELECRONS

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**A scietific Thesis
1956**

Editor (Original):
IL PUNGOLO VERDE, Campobasso (Italien), 1956
(Translation: G. Zwiauer)

One of the most intuitive and at the same time fundamental principles of physics is the fact that a force cannot exist without a body to which it is applied and therefore cannot be transmitted without the means to propagate it. But the fundamental fact observed with fields is the effect from one body to another at a distance. Now, if we do not presuppose a solid medium that transmits the force from its body to the other, we are entering the realm of the irrational. If the space between the two bodies were 'empty', it would only be absurd that one body could be remotely affected by the action of the other, unless one is content with the hypothesis of the 'particles ejecting a volatile liquid'. But we are no longer in the time of the ancient alchemists. Physics must above all be coherent: The fundamental reality of fields acting at a distance can only be interpreted under the assumption that space is a universal medium that is solid, incompressible and continuous.'



Ruggero Maria Santilli, 1982 (47yrs)

Let us analyze an elementary phenomenon of optics: the refraction of light in crystals with flat and parallel surfaces. As we know, the first refraction at the transition from air to crystal is due to a decrease in the speed of propagation of its wavefronts; but the second refraction at the transition from crystal to air is due to the

return of the speed of propagation to its original value. Now, this spontaneous increase in the speed of propagation undeniably presupposes the existence of a medium which propagates and determines the light, for from the dynamic point of view it is absurd that, if light is an independent entity, once its speed of propagation has decreased, it should spontaneously return to its original value, as happens with optical phenomena. Moreover, if light were an independent entity, as is currently assumed of matter, its speed would have to be composed with the speed of the source. But in reality, this never happens: the speed of light propagation is constant and independent of that of the source. In addition, a classical effect of sound phenomena occurs for light: the Doppler effect. In this case, therefore, light can by no means be independent, i.e. with its own dynamic behavior, but must be an entity determined by a medium.

But if we want to leave all this aside, we observe single and double refraction, interference phenomena, diffraction phenomena, polarization, absorption and other secondary phenomena in light. These experimental facts now presuppose in an absolutely unquestionable way the continuity of the classical wave. This means that optical phenomena have to be wave phenomena only and that light is accordingly an entity determined by a medium.

Let us now try to clarify this concept.

For sound phenomena, the propagation speed is always the same for all sounds: 330 m/s . It is a property related to the compressibility modulus of the medium air. At the transition from air to steel we see how this velocity, which remains the same for all sounds, increases sharply and reaches

a value of 5127 m/s . But also the propagation speed of all radiation is always the same, $3 \cdot 10^{10}\text{ cm/s}$. It is therefore, just like sound in steel, closely related to the stiffness modulus of the medium that determines it. The very high value of this velocity assumes that the medium is incredibly stiff and the interference phenomena are incomprehensible.

We call the medium space.

In brief: In order to interpret optical phenomena coherently, just as it happens to interpret fields, we have to assume that space is a homogeneous, continuous medium (i.e. not composed of parts as one might think of bodies that are ultimately of the order of $2 \cdot 10^{-13}\text{ cm}$), that it is also not compressible and finally, that it is much stiffer than steel.

These considerations create, despite the experimentally derived data, a well-known objection: If space is a rigid unit, how is it that bodies do not encounter resistance in their movement?

This objection, however, cannot be fully overcome by abandoning the concept of space, as physics has done since the 19th century, but by modifying the concept of matter, or rather by replacing the concept of corpuscle with a general mode of action of a dynamic nature.

Apart from that, the dynamic mode of action is required not only by the spatial concept itself, but also by a relevant amount of experimental data in the whole of physics.

In fact, the phenomenon of interference is revealed not only by sound and electromagnetic radiation, but also by the entire corpuscular radiation. This means that two electrons or two protons or even two molecular beams (Stern-Gerlach experiment) can disappear completely under certain

conditions of incidence, only to reappear identical again after this passage, without deviation from the previous directions. But then it is obvious that the corpuscular entities only appear to us as such, whereas in reality they are deeply dynamic states, states of pure motion.

But motion of what kind?

First we see that after the discovery of the interference of the corpuscular radiations, not only must we no longer abandon the concept of space as a rigid medium, but that we are forced to take it back in order not to plunge physics into the total negation of a recognizable reality.

Secondly, apart from obvious compromise positions, which dualisms can present, if we assume that the electron is a 'corpuscle', i.e. a sphere full of weighable substance, what could ever produce the forces acting in its electric and magnetic field? Absolutely nothing. In fact, it is absurd – from a dynamic point of view – that a static structure at rest can generate forces without itself being stretched.

If we consider the obvious facts instead, the electron appears as a dynamic state of an entity created by forces, forces that are already present in the particle itself. Space will then have the task of transmitting them.

Third, where does the energy come from, that is necessary to do the remarkable work of the fields? A mystery, the physicists answer, because the energy level of elementary particles is constant and independent of such work. If instead the double term 'rigid-space dynamic mode of action' is used, this fundamental fact can be fully interpreted. In fact, the problem of independence translates into independence of the work perfor-

med by the forces, that caused it, and those created by the forces transmitted. This dynamic mode of action is intuitive, because unlike the first forces, the second forces do not change space because of its incompressibility, that is, they are present only in the space surrounding the change.

Fourthly, we want to analyze Einstein's principle of converting mass into energy. It is easy to see that this is an absurdity, since this principle actually allows the transformation of a ponderable entity that occupies space into an imponderable entity that does not occupy anything. This exorbitant process of transformation contradicts the basic concepts of our logic, because a structure that occupies space will always remain so; it is only absurd to think that it can suddenly 'disappear' completely. So how can we bring physics back into our logical schemata? The answer is clear: by resorting to a dynamic mode of action. In fact, for the inverse transformation we may assume that mass is apparently a weighable entity, whereas in reality it is a profoundly dynamic state, i.e. an active energy state. In short: The **dynamic** mode of action forces us to transform the principle of converting mass into energy into the principle of converting one form of energy, into another.

From all this it becomes immediately clear that the current basic positions of science are completely unrelated to the analysis of experimental facts.

Since space transmits waves and forces, it is absurd to assume that it is empty, whereas it must be a solid, incompressible medium. And the elementary particles, since they interfere and generate forces, can by no means have a ponderable nature, but must be active energy states determined by a dy-

namic state of space points.

If one starts out from these basic assumptions, the benefit that science can derive from them is immeasurable. Indeed – besides the conclusive interpretation of optical phenomena, quantum phenomena and energetic transformations –, it is possible to grasp the desired general dynamic scheme of the structure of the universe; and on the other hand, it is possible to give a much more logical and clearer concept of the field, than the contemporary one based on the absurdity of the propagation of forces in a vacuum, and to interpret not only the mechanism of action of fields, but also in their generation.

It should be noted that the fundamental positions presented, o.i.e. the double term 'rigid space - dynamic mode of operation', are absolutely unassailable for contemporary physics because of a principle of Einstein: the inertial principle of energy. (This principle states that energy in all its forms behaves like matter in relation to the effects of inertial motion). In fact, because of this principle, it is absolutely the same to either believe that matter has a ponderable nature or to believe that it is of an active energetic nature, since the inertial behavior of the two states is identical.

Due to a limitation of the available text length, I will limit myself to presenting only the initial considerations of the Dynamic Action, showing how it solves the dilemma of the structure of electrons and light, by means of a unified view: without dualisms and contradictions.

THE ELECTRON

The question: 'What is the electron?' can be answered extremely simply on the basis of the dynamic mode of action. Considering that the assumed basic concepts must be movements of a set of space points, and space itself must be incompressible, the movement of the fundamental components of the electron can be nothing else but a harmonic oscillation. The elementary form of the electron is thus given by the simple harmonic oscillation of a space point with a maximum oscillation amplitude of 2.10^{-13} cm. This oscillation must form an inertial system according to the basic principle of dynamic action, i.e. it must, together with every other movement, pass it on to other points in space for an indefinite time in the sense of a movement until there are no more reasons to disturb the dynamic state. It follows from this that, because of the deformations which space has undergone and to which it is constantly exposed, in reality the electron can never retain its elementary form, because the harmonic oscillation is composed of one or more rotary motions, thus producing a unit which can have a plane or spherical shape. Analytical considerations of the fields lead us to believe that these other forms of the electron have special and different functions, so that they become the characteristic forms of the particle itself.

In this way we achieve the reconciliation between the corpuscular aspect and a simultaneous transverse wave without resorting to dualisms. In fact, the harmonic oscillation resulting from the rotational movement of the components can, under general conditions, take on all the directions of a rectilinear star and produce a structure that has the corpuscular aspect, because it is not on-

ly spherical but also indestructible and resilient, and represents a state of energy that is independent of the location of its center.

Especially the flat shape of the electron proved to be the basic shape of the particle when considering the fields. In the analytical theory of fields derived by means of the dynamic mode of action, this is referred to as the 'electromagnetic element', because it generates the electric field in the plane of the mode of action and a magnetic dipole in a direction perpendicular to it.

THE LIGHT

In the formula expressing the energy level of the electron at rest, it is clear that the total energy of the body is a function of the single frequency of the harmonic fundamental motion, since the component of rotational motion is notoriously constant and represents the 'spin' of the electron. These data allow us to interpret the quantum phenomena of emission and absorption. When an electron that is part of an atom actually emits a quantum of radiation because it passes from an energetic level to a lower one, it must emit a certain number of its fundamental oscillations, which propagate in space in a train of waves that also have a rotary motion component of rotational motion in a direction perpendicular to the direction of translation. In the case of absorption phenomena, the reverse process occurs naturally: The electron absorbs a train of waves by adding to the value of its fundamental frequency the number of oscillations that make up the absorbed train of waves, and thus passes to a higher energy level.

The hitherto so mysterious structure of light is achieved according to a unified view: light is a set of transverse wave trains emit-

ted by the electron, and in particular it is a characteristic modification of space determined by motion, which is composed of a harmonic motion, a rotational motion and a translational motion in a direction perpendicular to the direction of rotation. In this way the continuity of the classical wave, which is absolutely necessary for the interpretation of most optical data, is preserved, as well as the quantum distribution, which is necessary for the interpretation of the Compton effect and the photoelectric effect.

The reliability of the scheme given by the structure of light is given by the fact that it allows us to interpret not only all the data presented by wave phenomena in general, but also the mysterious phenomenon of polarization.

In fact, the common dynamic concept of reflection shows the disappearance of the rotating components of motion, leaving only the transverse wave in a plane, in accordance to experimental data.

In this way, the particle-wave dualism, based only on wave phenomena, is solved and overcome by the Universal Principle:

'Matter is a modification of space.'

HIGHER ELEMENTARY PARTICLES

The dynamic mode of action further enabled the development of a completely new theory about the nucleus and elementary particles – which follows that of the electron – and interpreted the complex phenomena of transmutation associated with it. Since, according to this theory, the higher particles that decay, emit electrons, and since their charge is always equal to that of an electron or zero, the particles emitted with the electron result in a dynamic state of 'he-

teronymous' electrons.

The scheme according to which these components are arranged cannot, of course, be the classical one governing the interaction forces of the electrons (i.e. a central nucleus and peripheral particles). It was therefore necessary to resort to a new dynamic criterion. According to this scheme, the higher particles consist of a number of neutral elements, all of which have the same essential properties and are made up of two heteronymous electrons rotating in the same plane, at the same angular velocity, radius and center of rotation. The two particles attract each other by their electric fields, but repel each other, losing the centrifugal forces generated by the rotation.

These elements, which are called 'neutrino pairs', are arranged for up to a maximum of 10 electrons in planes perpendicular to each other at generally different characteristic radii. This category includes the M^\pm mesons formed by 5 electrons, the π mesons formed by 6, the π^\pm mesons formed by 7, and the K^\pm mesons formed by 9. The remaining elementary particles are formed by a dynamic state of π mesons arranged according to a similar criterion of these mesons, i.e. in 'mesonic pairs' up to a maximum of 6 mesons, gradually forming the J^0 mesons, which are known to decay into two π^\pm , as well as neutrons and protons.

One of the merits of this scheme is the solution of the dilemma of the undetectable neutrino.

In fact, the decaying mesons emit excess electrons and neutrino pairs that are neutral and undetectable, like neutrinos. Since this is a very unstable dynamic state, the two electrons come into contact at the slightest impact, and, according to a well-known

fact of atomic physics, transform into radiation.

The scheme presented also allows us to interpret the charge of the parent particles, their decays, the spontaneous transmutations associated with the nucleons, and the fact that the interaction forces are present in one plane and not in all of space. It should also be noted that this scheme had already predicted the decay of a proton and an antiproton into mesons before the discovery of the antiproton, electrons and radiation quanta, although of course it had already indicated the scheme of the antiproton itself.

DYNAMIC ORDER

If one interprets even the higher particles, it can be said that the general dynamical scheme of the structure of the universe has been discovered. In fact, the physical determinants have now been reduced to two: electrons and radiation quanta. Therefore, if we remember that space is an incompressible medium, we can announce the following basic principle:

All energetic states determined by space modifications perform a basic movement, which is a harmonic movement of a point in space. Rotating, circular movements are secondary component movements that contribute to the increase of the total energy of the system.

Matter is thus a set of harmonic oscillations of space points, which have the property of constituting singular inertial systems; i.e., combined with other motions, they preserve them indefinitely and transfer them to other space points in the sense of continuous motion.

In this way the contradiction which led

physicists to abandon the essential concept of rigid space is finally overcome; indeed, during the motion of a body absolutely nothing material moves; what happens is that the motions of its constituent parts are transferred from some points of space to others in the sense of motion in space.

The formulae of dynamic action also allow the elimination of mass from atomic physics, as desired by Einstein: in fact, the symbol m never appears in them, but always that which is equivalent to it, E_T , because matter is no longer the sum of unspecified particles with kinetic energy, but an ever-active state of energy determined by some basic oscillatory motions and several secondary component motions. The dynamic inertia is no longer due to mass, which is an abstract and unspecified substance, but is directly proportional to the total energy of the inertial system according to the coefficient $1/c^2$. In this way, the distinction between rest mass and mass with velocity v is avoided, as the formulas of the dynamic mode of action always capture the total energy of an inertial system, thus enabling us to arrive at a universal and at the same time analytical view of the dynamic behavior of bodies.

It follows that the current principle of conservation of mass-energy is changed to the principle of conservation of energy alone, since matter is energy in action; similarly, Einstein's principle of the *equivalence* of mass and energy, is changed to the principle of the *identity* of mass and energy.

The views thus achieved restore the longed-for inner unity of physics without dualisms and illogical positions, but also mark a reconsideration of a basic concept of science: the distinction between bodies and emptiness. Space, that must transmit waves and forces, must be full, and matter, which must be a dynamic state of this space – because it interferes and generates forces – must be 'empty in relation to common concepts'. If we could stop all its movements for a moment, matter would disappear completely, as it actually does, whenever corpuscular radiation interferes.

Original: R. M. Santilli, 'Perché lo spazio è rigido (1956)
<http://www.santilli-foundation.org/docs/Santilli-49.pdf>

Translation: G. Zwiauer,
<http://www.QQL.ch>

Version A-2020-06-04 21:09:58+02:00