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Origin of the Action

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Abstract: ***Quantum state can be modified by the presence of other quanta, without any action from these coming is always detectable. This implies that among adjacent quanta information's exchanges, supported by a sensory and creating a mutual dependency, occur. The information can determine in the adjacent quantum the development of an action or may be relayed to other adjacent elements, task carried out by quanta of space. Speed's limits are due to braking action exerted by space through gravitational and electromagnetic actions by it mediated. Information does not solicit any braking action exerted by space and can therefore travel at a speed higher than that of light.***

Keywords: informative interactions, space mediating action, space braking action, panpsychism, information' speed.

1. Essence of space

It seems incredible that in the context of a philosophical and scientific discussion which has involved the largest genes of humanity, Aristotle, Descartes, Newton, Leibnitz, Maxwell, the central role of space in the generation of being has not been understood, even made to coincide with is opposite, nothingness. And this to the point of foreseeing something that fills it to justify the action at a distance such as the plenum of Aristotle and Descartes [1], the ether of Maxwell [2] or the force fields of current physics. Only Plato said that "matter and space are the same thing" [3].

The problem can be placed in the direction of establishing if the space must be considered as an entity that is part of the physical reality or whether it should be considered as a not physical entity the structure of which cannot therefore be altered by the events of the physical world. This second solution has dominated the human thought up to more recent times; for Newton the space could be considered as an infinite container whose structure could not be altered in any way by the physical events that occurred in its interior as well as by the addition or subtraction of matter or energy, so that it could affirm that the empty space coincide with nothing [4]. Even those who believed that the space contained a "plenum" or an "ether" or "force fields", have not advanced the hypothesis that the space, simply, is itself a physical entity, despite this should seem now incontrovertible after the enunciation of general relativity that has shown the existence of a gravitational interaction between matter and space and the consequent consideration of the latter as a gravitational entity. Indeed, there is no doubt that gravitation has the characteristic of two-way nature, namely that a body which undergoes the gravitational action is also able to exercise it.

If we consider this solution, i.e. the membership of the space to the physical world, that of being, it is clear that the existence of nothing can not be assumed because there cannot exist what by definition does not exist. The hypotheses more reasonable that we can make is that being is infinite, albeit composed of parts that can be distinguished in some way, i.e. the hypothesis of an infinite multivers

2. Relationality of quanta

The conceptual framework developed by the physics of the twentieth century with the theories of relativity and of quanta obliges us to having to consider the space and the time as constituents of single entity and enables us to believe that this spacetime has granular nature, i.e.that it is composed of elements infinitely small, the quanta, whose composition, as in a puzzle, determines the space and the time which we perceive them.

The quantum is a relational structure, i.e. is always in coordination report with the outside without it being always possible to identify an action coming from the outside from which the coordination process depends. The problem already existed in traditional physics in the occurrence of the gravitational interaction between two bodies which requires the necessary prior warning of the reciprocal presence and this even when the bodies are far away. In fact, to a specific question in this sense, Newton answered that he did not know how this happened even though it was certain that it happened. And there is no doubt that the study of interactions between bodies has led to extraordinary advances in scientific knowledge, but it is equally true that the ignorance of the origin of the action that triggers the relational process has deprived science of developments of great importance .

Returning to the level of the ultimate components of being, we find that the problem was already placed for the Leibniz monad. Also the monad is an indivisible and closed entity that changes in terms of coordination with the outside autonomously, not by effect of a mechanical action outside against which is impenetrable. The problem, as it is known, was not solved by Leibnitz, (since it cannot be said solution the call to a demiurgic action) but the overall framework of the being that we are getting by the physics of the twentieth century has in itself all the elements to solve the problem. It has shown us that the motion, from which originates the concept of time, is part, as a fourth dimension of the elementary component of the being. This means that the problem of the feeding of the change from the outside of the quantum does not exist because the motor of change is already inside the quantum. There has also shown that the existence of a capacity to hear the other constitutes a necessary and unavoidable condition in order to occur the relationality that translates into the interaction that is at the origin of becoming. It follows, equally necessarily that the indivisibility of the quantum cannot deny the existence of smaller components held together by bonds that, while being of enormous force, does not prevent superficial minimum exchanges or

excitation states necessary to hear others quanta with whom to relate, i.e. to have the sensitivity.

Of course, the sensory element must not simply "feel" the other and to produce an action because this would not give rise to any organizational process but the achievement of the maximum entropy, as we now know from similar problem, governed by the second law of thermodynamics, related to a set of molecules that interact, in limited volume, just through the passage of heat. The sensory must be constituted by a certain number of sensor elements that, through the positional variation or the differentiated excitation, can transmit a signal consisting of a certain number of bits relating to belonging to one of the fundamental forces and, within this, the characterization of attraction or refusal of the response.

Therefore, in the scheme that flows from the combination of theory of relativity - quantum theory, wherein the nothing does not exist, it is necessary to think at a sensitivity of contact between the adjacent elements of the space that operate as mediators. The sensory information may be relayed to other adjacent elements until it reaches an element provided with a structure of recognition which gives rise to the action (which can be of attraction or refusal, in one of the fundamental forces) i.e. with which it establishes a motional dependency, so realizing the distance action..

If the quantun does not exist alone, if he needs the other to exist, means that it exists in that part of the whole. Therefore the relationalism that manifests itself through the link constituted by sensory information and that through the recognition can become a strong associative binding is the glue that returns to the universe the characteristic of indivisible unity which was removed from the theory of quanta. While tying the particles in a manner indestructible makes it possible to change the mutual position (as we have seen through the phenomenon of "entanglement" even at a great distance) and the dependency bond.

We must therefore consider sensitivity to the other as a constituent of the last element and this conclusion coincides with that of the theory called "panpsychism", since sensitivity is the source of psychic activity. This theory has been developed within the scope of the studies in psychology, then in an area well away from that of quantum mechanics, for the difficulties otherwise insurmountable to explain the birth of psychic mechanisms starting from inanimate matter, in particular of conscience, that does not seem to be able to reduce to a robotic mechanism governed by the laws of classical physics. Also the variation of the dependence has its psychic equivalent in the "transfert".

Of course we will have to consider that the development of complex system is always accompanied by a development of the sensory information, of its layered structure according to level of stiffness and the possibility of modulating the more flexible part, conditions that cause the onset of new features not detectable at quantum level. However, I think it is very interesting to detect how thought is constituted, as already sensed by Aristotle [5] from the modulation of sensory in its more flexible part [6], as well as to detect the existence at all levels of complexity of a rigid unchangeable part of sensory, which transmits irrepressible commands that may be laws of nature or memories acquired in the course of the evolution of the system.

3. On the elementary gravitational interaction

The most important contribution given by Newton in physics, from which fundamental results of mechanics are derived, may arrange to lie in the following proposition: "In every physical phenomenon variational, i.e. not inertial, the phenomenon's variations occur in correspondence of variations of the coordinates infinitesimal of the first order (first derivative). In correspondence of variations of the coordinates infinitesimal of the second order (second derivative) changes of the phenomenon are totally negligible.

The most important contribution given by Einstein can instead be lie in the following proposition: "In every physical phenomenon variational, i.e. not inertial, exist not only changes that occur in correspondence with variations of the coordinates infinitesimal of the first order (first derivatives) but also changes that occur in correspondence with variations of the same coordinates infinitesimal of the second order (second derivatives). The two types of variation are of opposite sign and occur on the same object elements.[7].

I observe, incidentally, that for Newton, inventor (in competition with Leibnitz) of the infinitesimal calculus, could not escape the consideration that the integral of the second variations could have had a great importance if the integration field had been large enough. The observation that even at the level of fields very extensive, such as for example the solar system, the determination of the values of the physical variables showed no sign of a contribution of the second variations, led him to take account not only of the negligibility, but even of their nullity. Einstein instead showed that the second variation is never anything, but it is so small that it not be detectable if we do not assume integration intervals much larger than those considered by Newton, for example, as regards the variables astronomical, galactic dimensions or of the entire universe.

Let's now review the analysis made by Newton, of the motion of the two masses m_1 and m_2 subject exclusively to mutual gravitational attraction making the changes imposed by the theory of relativity [8]. The assumptions that are at the basis of the study of Newton are: bodies absolutely rigid, isolated system, no interaction with the observer. Let us consider in particular the movement away that follows the clash of the bodies. This motion is characterized at each instant by the values of the relative velocity of the two masses and therefore of the kinetic energy E, of the force of gravitational attraction F and of the distance between the two masses s. In the discussion

Newton assumes that a gradient of the kinetic energy determines a force able to counteract the gravitational force. Newton i.e. wrote his famous report:

$$dE/ds = -F \quad (1)$$

That implies the development of a variation of kinetic energy equalizing the gravitational force in correspondence of each value of the distance. The function of the kinetic energy is obtained, in the handling of Newton, integrating the (1) obviously replacing F with the expression of the gravitational attraction and thereby obtaining

$$E= -km_1 m_2 /s+C \quad (2)$$

where k is gravitational constant and C the initial value of E.

Therefore ,according to the classical treatise, if the kinetic energy has an initial value high enough (value of escape) there is in the process of distancing that follows the clash a point starting from which the gravitational attraction decreases more rapidly than the kinetic energy so that the movement away becomes irreversible.

According to the theory of relativity instead, during the process of removal occurs a transformation of kinetic energy into mass which implies an increase of the gravitational attraction in equivalent quantity, transformation that ended only with the exhaustion of the kinetic energy so that it is always reached a point of reversal of motion from away to approach, whatever the initial value of the kinetic energy.

Einstein has explained the reason why these transformations are escaped in the context of classical mechanics: "*a direct comparison with the experiment is not possible today because the changes of the energy E to which we can put a system are not large enough to be perceived as a change of the inertial mass of the system. E/c^2 is too small in comparison to the mass m that was present before the energy alteration"[9].*

In the removal stage therefore occurs a process of condensation of the energy quantum infinitesimal of the first order to mass quantum infinitesimal of the second order while the opposite occurs in the phase of approach, i.e. the expansion of the mass quantum infinitesimal of the second order to energy quantum nfinitesimal of the first order. The physical phenomenon appears as a process transformational oscillatory.

It is important to detect, for the purposes of development of this work, as the amplitude, in terms of time, of the oscillation between the initial point of movement away and the final point of annulment of the kinetic energy, changes when the initial values of speed and gravitazional attraction vary.

As regards the gravitational attraction initial is obvious the growth with it of its braking power of the motion away and thus the effect of decreasing the size of the oscillation.

As regards the effect of the initial speed must be considered, in line with the quantum theory, the gravitational forces as consisting of a set of force's quanta, each agent on a quantum of spacetime characterized by a certain amount of space per unit of time. The achievement of a higher speed thus implies the presence of a greater amount of space in the same time (principle of superimposition of states) and then a plurality of gravitational forces elementary agents at the same instant,. In substance this is tantamount to saying that the space units solicit the gravitational forces and therefore their overlap in speed causes a greater overall gravitational stress. In conclusion, the size of the oscillation decreases as the initial values of both gravitational and velocity increase, as already stated by Einstein and Infeld [10].

There is therefore a limit value of the initial speed at which the size of the oscillation is canceled; all energy is instantly transformed into mass. Of course this limit is variable depending on the size of the gravitational force initial. There is also a limit of gravitational attraction initial wherein the amplitude of the oscillation is canceled, whatever the speed, i.e. there can be no movement away for his immediate transformation in mass (black holes).

In the light of the results of the general theory of relativity, according to which there is interaction between the matter and the space, we believe that the results achieved may be extended also to the condition in which the moving body is not under the action of another body as in the case examined, but it is in free movement in space. In this case we have to consider that the first law of dynamics, in the formulation of Galileo and Newton, is not completely correct since it does not take into account the braking action of gravity exerted by the space, albeit by infinitesimal of higher order than the first, then for distances enormously large.

4. On the light speed

Therefore there is not a single limit value of the speed of gravitational bodies, in the sense that there are many values limit how many values of the gravitational force. In the case of inertial motion in which the braking element, ie the gravitational force exerted by the space, has a constant value, there is obviously only one limit speed value for every body's mass.

A similar condition must be met in the case of light in which the braking action is constant. Let us consider the second principle of dynamic "F=ma";where F is a force. m is the mass and a is the acceleration, i.e. the derivative of the speed. If, while keeping constant the force, we reduce the mass, the acceleration increases; we can say that, to tend toward zero of the mass the acceleration tends to infinity. Since the light has no mass, at the slightest stress the particle should undergo enormous acceleration and reach an infinite speed. This application of the second law has however the drawback of not considering the variation second that contains the braking element constant and that brings the speed limit to c. Of course, when the mass approaches zero, the limit speed approaches the speed of light so that we can say that the speed of light is a speed

limit for all particles undergo a resistance on the part of space even if only very small mass elements can reach speeds approaching that of light

5. On the information speed

In the gravitational and electromagnetic fields we always have a particle which moves away and another that opposes the away according to different space-time metrics. This does not happen in the case of information where there is no particle that moves but only a message that is transmitted through the surface contact without raising any resistance and with a speed which in theory could be infinite. It is the only case in which the relativistic law according to which in any physical phenomenon it is necessary to consider the variations infinitesimal of first and second order is not acting because in this case the two opposing variational causes that can give rise to the dialectical process do not exist. The process takes place entirely within the scope of the smaller particles existing in respect of whom an infinitesimal of higher order do not exist.

The sensitivity to the other introduced in this study constitutes an immaterial communicative link between quanta that forms a network that encompasses the entire universe in an immense communicative system within which the communication can travel at a speed greater than the speed of light. It is constituted by a modification of the arrangement of certain components, i.e. the shape by means of minimal exchanges of energy at local level, to sum anything, It clears the relativity of simultaneity and therefore allows the determination of an absolute time.

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Author Profile

Sisto Firrao was born in Cagliari (Italy) on 31 January 1931. In 1953 he obtained his master's degree in engineering at the University Federico II of Naples (Italy). Therefore he began a career in the context of the textile industry that culminated in 1967, in the position of central technical director of the “Cotonificio Valle di Susa”, of Turin (Italy), company with 14 establishments and 20,000 employees. Parallel performed academic activities by acquiring, in 1968, the professorship in technologies and teaching "Statistical Quality Control" in the textile graduate course of the Polytechnic of Milano. Subsequently he dedicated his work to the study of complex systems, directing the magazine "Quaderni di Cibernetica", today ceased, conducting a blog at web address www.complexsystems.it and publishing four books (The Theory of Self-Organizing Systems in Physics, Biology and Psychology, (Cens, Milan) Essays on Cybernetics (Edint, Milan) Studies on Complex Systems (Cens, Milan), The Power and the Fear (Lulu.com)). He has to his credit over 100 publications in important magazines Italian and ester.