International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Self-Organization of the Matter

Ing. Sisto Firrao

Professor, Polytechnic of Milan, Italy

Abstract: ***In this study, general relativity is applied to the physical problem consisting of the modalities of self -organization of the matter. Two limit cases are examined. First of all, the situation in which two bodies are confronted. It is shown that between the action produced by the gravitational force and the reaction carried out by electromagnetic force takes place an oppositional dialectic that leads to the formation of a contraction of Lorentz. Therefore the space occupied by the system decreases and this involves the approach of components and consequently a growth of the attraction produced by the electromagnetic force that leads to the fusion of the components. The situation is therefore considered in which numerous mass elements interact within a certain spatial dimension that is to say a thermodynamic set. Reading in terms of general relativity requires the presence of an expansional component of the internal energy that opposes the centripetal component.The expansional component causes the escape of particles from the system even in the absence of any external energy intake and the dialectical comparison therefore also produces in the isolated system state. It shows itself how the organization of matter is the product of the dialectical contrast of the fundamental forces and that everything is produced in the scenery of the world always follows this representation. Even human society, also man, contain contradiction in their structure.***

Keywords: Self-Organization, internal contradiction, action, contraction.

1. Introduction

The most important result of general relativity consists in the cancellation of the presumption that the energy and the mass, the ultimate constituents of being, are elements irreducible to each other. It has shown how the two elements can be transformed into each other so that different ways of presentation of the same matter appear, matter constituted by the movement that in energy follows a straight direction of expansion and in the mass follows a curvilinear path of winding. Of course, in the context of the new theory, the term "energy" cannot have the meaning learned at school, as a potentiality of producing a movement, but that of being a straight movement in progress, action. Just as the mass takes on the meaning of curvilinear movement in progress, contraction.

It is extremely important to detect how the two elementary components of the transformations, i.e. energy and mass, do not have the same space-time dimension: in the face of infinitesimal growth of the first order of energy, (i.e. first derivative) an infinitesimal reduction of the second order (i.e. second derivative) occurs of the mass. This implies that the production of action can affect enormous volumes and hundreds of years where the corresponding reduction of the mass remains not perceptible. However, the reduction of the mass, albeit infinitesimal, exists and is obviously represented by an infinitesimal decrease of the bonds that make up the mass elements. Conversely, in the face of an infinitesimal decrease in the expansion, an infinitesimal increase of the second order of the mass occurs, which can be expressed as an increase in the bonds that make up the mass elements.

We must therefore believe that there are two types of connections between the elements of reality, those of a straight type that are determined between the elements subjected to a process of action and the curvilinear types that are determined between the elements subject to a contraction process.

And it is also important to detect how space in these processes is not an external element but it is a fundamental component: it becomes energy or mass together with the objects contained in it, so that we can speak of transformations of the space-time occupied by the system. We can therefore say that in the transformation in which the energy turns into mass, all the dimensional variations described for the contraction by Hendrik Lorentz occur [1].

Finally, we are used to considering the movement as an attribute of a body, we do not conceive a movement that is "substantia rei". But Heraclitus, many years ago, has already placed this hypothesis, summarized in the phrase "παντα ρει", at the basis of his conception of the world.

1) The self-organization of matter

The transformational processes find their origin in interactions that take place in terms of attraction or rejection between charges in the fundamental forces belonging to the interacting bodies, charges that are called "sensors" [2].

In this study are treated the transformational processes, due to the dialectic between gravitational force and electromagnetic force, which give rise to the autorganization of reality at atomic level.The two fundamental forces act in competitive terms by developing actions of opposite sign that give rise to contractions that can evolve in a sensory modulation mechanism that constitutes the basis of thought. That thought coincided with the sensory modulation process was already guessed by Aristotle [3] and this result has been confirmed as a property of the stratified networks containing a pole of attraction [4]. Each body, in the context of those we are examining, is equipped with one or more sensors in each of the two fundamental interacting forces. When the information of two bodies is complementary, that is to say they recognize each other by developing attractive forces between the sensors, a process of action or contraction occurs. The process of action, transformation of mass into energy, is realized when the recognitional attraction does not find obstacles to achieve contact between the two bodies producing the transformation into energy of an infinitesimal element of the mass of the other body. In the process of

contraction instead the attraction must exceed opposite forces to give rise to contact, and this by climbing over the oppositional forces through the bending of the straight motion, that is, of the energy, which is transformed into a rolling movement around both interacting bodies, i.e. in mass.

To achieve our goal, to discover the laws that govern the process of self -organization of the matter, we can examine the simplest case, of interaction between two bodies, already addressed by Newton and subsequently the most complex case of a system of multiple bodies, already faced by Boltzmann [5], and subsequently by Prigogine [6].

2) Self-Organization of the binary system

We therefore consider the analysis made by Newton, of the motion of two m_1 and m_2 masses subject to mutual gravitational attraction, bringing the variations imposed by the theory of relativity. The hypotheses that are the basis of Newton's study are: absolutely rigid bodies, isolated system, no interaction with the observer.

The mutual gravitational attraction gives rise to an accelerated motion that gives rise to the clash. On the basis of the third law of dynamics, according to which each action corresponds to an equal and contrary reaction, Newton believes that the clash leads to a motion of mutual removal at a speed equal to that reached at the time of the impact. Faithful to the epistemological precept "*Entia non sunt multiplicanda preater necessitatem*" he believes that there is no need to clarify what the fundamental force that produces the reaction is, but we are justified in considering is due to an action produced by the electromagnetic force operating inside the reagent bodies.

Straind, according to Newton, the movement of removal is characterized, in every instant, by the speed values of the two masses and therefore of energy and by the values of the gravitational attraction force F and of the distance between the two masses s. Newton assumes that during the motion and for each value of distance s there is an energy gradient that produces a force capable of counterbalanced the gravitational force. Newton, that is, wrote the famous relationship

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

By integrating the (1) obviously by replacing the F with its explicit expression in terms of masses and their distances, the function of energy is obtined.

$$E= -km_1m_2/s + C \qquad (2)$$

where k is the gravitational constant.

Therefore, according to the classic treatment, if the energy has a sufficiently high initial value, (said escape value), there is in the process of removal that follows the clash a point from which the gravitational attraction decreases more quickly than energy so that the movement of removal becomes irreversible. If, on the other hand, the initial value of energy is lower than the escape value, it reaches a annulment point in which therefore the motion is reversed and the two bodies give rise to the repetition of the process that thus assumes an oscillatory trend.

According to a first relativistic approach, however, during the process of removal there is a transformation of energy into mass that implies an increase in gravitational attraction in equivalent quantities, a transformation that ends only with the exhaustion of energy so that a point would always be achieved of inversion of the movement from removal to approach whatever the initial value of energy [7].

However, we remember how the transformation of energy in mass gives rise to a contraction process, i.e. of downsizing the space occupied of the system, with the consequence of a mutual interpenetration of the information structures of the two bodies. From this emerges selectively a strengthening of the attraction resulting from the reduction of the distance between the sensors to which the attraction is due. The contraction process continues by infinitesimal elements until total elimination of energy is reached, a condition in correspondence with which the aggregation of the two bodies is realized, aggregation constituting the elementary process of self-organization.

3) Self-Organization of the thermodynamic set.

We now consider a certain spatial dimension within which numerous mass elements move due to the kinetic energy associated with them. According to the classic thermodynamic theory, also today generally accepted, the system, even if capable of increasing the order coming from the outside if the latter reaches a certain size [6], is not able to produce a self-organization in all other conditions. The system always leads to a final condition of homogenization of microstates throughout the system, defined as maximum entropy, a condition in which it is not possible to create any form of organization. This proposition constitutes the second law of thermodynamics which has aroused, in view of its consequences on the level of the destiny of "thermal death" to which it condemns the universe, a huge amount of debates and objections on both scientific and philosophical levels.

But no one has thought of applying the news introduced by general relativity to thermodynamics.

We therefore consider a thermodynamic set in conditions of the thermal equilibrium and suppose to introduce in it a quantity of energy in the form of a thermal differential. We consider that an irreversible and a reversible transformation are produced in the system. According to the classic theory, the irreversible transformation would obviously be fed by the thermal differential introduced while the reversible transformation would be fed by infinitesimal components of this differential.

For general relativity, the energy introduced cannot undergo reductions that not are made up of the increase in internal energy and the work performed. In this case, the maximum entropy would be worth reaching, as required by the second law of thermodynamics, but no reversible transformation could be had. In fact, the presence of a reversible process demonstrates the existence of a contraction because it is in the mass bonds that the contraction induces that there is no

strong friction on the element mediator bearing the information, friction which is variable with the direction of motion. Furthermore, the speed of communication exceeds the speed of light, conditions that involve the full reversibility of the processes. Consequently, the presence of an reversible process involve that certain gas particles in addition to having to follow the gravitational attraction (centripetal component of internal energy) must also follow an opposite anti-gravitational attraction (expansional component of internal energy). Theses components arises in dialectical opposition giving rise to the contraction phenomena that lead to aggregations, fundamental rings of the organization processes. Obviously, the supply of energy from the outside, determining an increase in internal energy, also determines an increase in the values of the interacting components and therefore of the contraction, but it is fundamental, for our purposes, to determine that the process is realized, to a certain extent, independently of this contribution. To this end, it is necessary to investigate how the particles equipped with the expansional component of internal energy are positioned [8].

A gas under pressure will spontaneously expand in a predisposed void: the flow of heat and the reduction in the temperature can be negligible. In this case, a type of energy associated with pressure operates without any need to be accompanied by a temperature gradient.

Internal energy in perfect gases is defined by the pv product (where p and v refer to the pressure and volume). We must therefore distinguish the pressure that gives rise to the expansion for its particular feature that adds to that of being a component of internal energy.

The pressure is defined as the force transmitted by the kinetic energy of the molecules to a unit of area. If we have to ignore the differences in the temperature and therefore in the kinetic energy of the molecules to the various points of the system, the only further possibility of distinguishing the pressure is that it varies in accordance with the position in the system of the reference area considered, being equal the kinetic energy.

As it is known, the directions that the molecules of a perfect gas can take are completely random determining a homogeneous distribution of the kinetic energy of molecules in a system in thermal balance. Therefore, if the system is infinite, the conditions and therefore the pressure carried out on a unitary area will be identical in every part of the system. If, however, we take a finite system and its interactions with its surrounding environment, we must consider the fact that the pressure operates on both sides of a surface located inside the system, but on one side of the superfix at the edges of the system.

So we do not obtain symmetry conditions for external surfaces and a driving force, espansional component of internal energy, determining a condition of permanent expansion, is consequently produced (see the ordering action induced by the elimination of symmetry constraints in Prigogine [6]).

The particles that are part of the expansive current are in a dialectical position towards the particles that transport the gravitational attraction and therefore enter into contraction with them.This phenomenon also occurs in the context of an isolated system in which it induces the variations produced by the peripheral contractions.

2. Conclusions

I am not interested in showing in detail the complex contraction process to which the gradual extroversion of the energy of the isolated system gives rise. I am only interested in showing how the becoming of being is produced by the dialectical contrast of the fundamental forces and that everything is produced in the scenario of the world always follows this representation. Even human society, also man, contain contradiction in their structure.Therefore there is no free will. All of us, men, strong or weak, part of power or mass, we are slaves of our impulses and the forms that they take on in social reality, of the faiths and prejudices, finally of the illusions and hopes that impose us.

References

[1] Mazur E.: Principles & Practise of Physics, Pearson Global Edition, ISBN 9781292078861
[2] Firrao S.. Origin of Action, in International Journal of Science and Research, Volume 9, Issue 3, March 2020
[3] Aristotele: De Anima, Laterza, Bari, 1973, (Γ), 3, 427a, 427b, 428b
[4] Firrao S.: Il processo di associazione stimolo-risposta nelle reti stratificate, in Studi sui sistemi complessi, Lulu.com ed. ISBN 978-1- 4476- 3406-5
[5] Boltzmann L.: Vorlesungen uber Gastheorie, Leipzig, 1896
[6] PrigogineI.,NicolisG.:Self-Organization in Non Equilibrium Systems, John Wiley, New York, 1977
[7] Einstein A.: Uber die Spezielle und Allgemeine Relativitats-theorie, Lipsia, 1916
[8] Firrao S.: New Basic Results on the Thermodynamics of Irreversible Processes, Cybernetica, volume XXX, n°2 1987,
[9] Firrao S.: Obsolescenza del Principio di Non Contraddizione. Quaderni di Cibernetica,3,1987, Milano