

The Universe

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The Universe

Absolute and Relative

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1. Introduction

The scientific knowledge helps us to decipher the secrets of all things from this Universe, to solve the mysteries of their emergence and of their interactions. Better or less good explanations were given across the ages, using different terms and means. Democritus has tried to show that all objects are composed of very small, indivisible particles called atoms; he said also that the connections between atoms made all things possible and allowed the diversity of matter. It was a logical, pure rational explanation, highly advanced for those times, which has really opened the gates of human knowledge.

Science and philosophy progressed a lot since then; now, after more than two thousand years, we have a fairly complete picture of atoms. The scientific experiments have led to the development of some quantum physics theories that all suggested the existence of an internal structure of atoms; thus, the atoms proved to be formed of smaller things, later called particles. These new entities, elementary or composite, are all interacting due to different forces that are generated by some special "fields". Currently, the Standard Model of particle physics explains quite satisfactorily all interactions of these matter constituents, at quantum level. Along with the Theory of Relativity, it succeeded to provide an almost perfect model of reality; the connections between time, space, energy and mass were transposed in simple and general equations, at both quantum and macroscopic scales. However, with all the scientific development over the last hundred years, there are still many unanswered questions. For example, this universal force called gravity, which links all the bodies from the outer space, has not

yet a complete physical and theoretical explanation, unanimously accepted by scientists. The equations giving the magnitude of the gravitational forces have all been written, and the 'curvature' of space around massive bodies has been well quantified. However, a clear explanation about what causes the gravity, about the true nature of this field (and even of the other ones) is still expected. A couple of new theories have appeared lately, Quantum Gravity and String Theory; despite their exotic beauty, the expected enlightenment is not brought yet upon this subject. Gravity seems to be now even more difficult to understand.

As some objective limitations are present in the experimental field, matter cannot be "probed" below a certain dimensional scale, regardless of technology; therefore, a great opportunity arises for physicists and mathematicians, namely to develop new theories that may be based more on imagination instead on concrete aspects. The same thing is also happening at cosmic scale, where we have already reached some limits of observation.

In order to overcome many of these obstacles, my recent decision was to add one more "layer" to the description of all things, at a truly fundamental, sub-quantum level. The related theory of physics was widely presented in a book named **Prime Theory** [6] that has been published a year ago. Space was considered as having a granular structure, which means that matter, at any level, is actually made of a unique raw material; in addition, all characteristics of this granular constituent have been described in great detail. Therefore, logically and unequivocally, rational explanations have been easily shaped for all the subjects remained in question, such as gravity, mass, electric charge, unified field, etc. The mechanisms of granular interaction have

offered a common ground to describe all fields, including the gravitational one; it also allowed detailed explanations over the genesis, the shape and the stability of any elementary particle. We do not get back this way to the 19th or 20th century ideas, when the problem of space graininess was seriously taken into account; we rather make an important progress by inserting this necessary corollary of new principles into Quantum Physics. All the quantum mechanisms will therefore have a surplus of determinism and rational, while many of the basic principles remain unchanged. At the fundamental level of matter, however, the elementary rules of interactions have all been extended and adapted, but this will lead eventually to reasonable and causal explanations for any known phenomenon.

If we detach ourselves a little from the usual, these things would seem normal and no one should be surprised. It is natural that once the scale is reduced to the granular level, the complexity decreases and all the interaction laws become simpler, reaching an absolute elementary. Also, it seems natural that matter of any kind has a common and unique factor, a minimal ingredient that only operates on a basic set of rules. The initial granular fluxes (much stronger) generated the first stable rotational structures and then imposed their interaction rules; the most part of particles in our Universe were produced this way. It also seems normal that there is a minimal level of energy, the granular level, which determines the conservative interactions between granules or those between fields and particles. These are the natural explanations for a deterministic and causal reality, which all were given in detail by the Prime Theory, presuming a closed, perpetual moving and forever expanding Universe; they also include a profound relativization of all the nature's laws,

starting from the lowest possible level of matter - the granular one. However, a new reference point will be further added to this deeply relative Univers, especially by the ***Theory of the Absolute*** chapter. As far it is possible, the connection with the actual formulas and theories of physics (in particular with the Theory of Relativity) will be closely maintained. This is my personal attempt to put the cornerstone of a new construction, intended to succeed describing the physical reality in an exhaustively manner. My approach is clearly deterministic, entirely based on knowing the concrete nature of things; as we really understand their functioning mechanisms, we may write all the mathematical equations that could describe them precisely. There are causes and effects for any phenomenon. The mathematical equations, which are trying to express the rules by formalization, are not fixing at the same time the true meanings of things and phenomena, only their objective nature might do that! Thus, the limits and solutions of these equations do not always have a physical equivalent in the real world! Consequently, the natural order of steps a scientist should make is this: firstly, he gets to the basic meanings of reality, then analyzes and understands them, and finally he may try to elaborate the appropriate theories. Even this kind of theories, sometimes excessively abstract, must be continually corrected and improved while we are gaining more and more concrete knowledge of the physical phenomena.

2. Absolute and relative

2.1. Universe - Moment Zero

Let's analyze all things in a temporal and causal context, where the Primary Universe would have been born through the First Bang, then it evolved, transformed, its matter aggregates and then compresses, and new universes were finally generated through other Big Bangs. PT made a detailed description of the Primary Universe's creation: it all has started from an undefined "nothingness", which through an essentially mechanical process (like a fluctuation) has been separated at a given time in those two constituents of space, the "full" and the "empty" ones. Thus, the entire raw material has been created in a compact form: we have in fact a huge "primordial granule", filled with matter, enclosed within an empty three-dimensional space, where it may move in any direction. The fundamental equation that describes the Primary Universe's genesis may now be written:

$$0 = X - X \quad (1)$$

This equality should be only regarded from left to right, because it means a transformation, an **irreversible** separation of the nothingness (**0**) in two different, complementary things, something (**X**) and anti-something (**-X**). More specifically, both *space* and *matter* appeared this way, as a closed three-dimensional framework and respectively, as primordial granule. However, there still are a few unknown things in this scenario, like the origin and the consistency of that "nothingness". The mystery behind the Universe's genesis could last forever; any theoretical hypothesis we would formulate, it cannot be applied

at this *zero moment* of time, when a very clear limit of the principle of causality is reached. Moreover, a closed Universe objectively adds some cognitive barriers, which all suddenly appear when you try to define and analyze its *unique* primordial material.

This genesis process continues as follows: the primordial granule, whose material is characterized by a perfect elasticity, begins to divide. Initially, it only splits up in two parts, and this is the first mechanical movement that ever appeared. Those two halves started to move one to the other, within that elastic "bubble" of space. As it has been shown in PT, this granular division will continue faster and faster, and increasingly smaller fragments of matter will collide at increasingly higher speeds; whole phenomenon is naturally accompanied by the expansion of the spherical space – the frame where all this happened.

At the end of the division process, a virtually infinite number of infinitesimal granules will result from that primordial, huge granule of matter (presumed fixed); they all are continuously moving, perpetually bumping into each other and into the edges of space. This is a simple mechanistic hypothesis, but it is the only one justifying formation of those two components of the Universe, which explains the granules and their movement, and which may further describe the creation process of all elementary particles by granular aggregation. This Primary Universe's birth model was built considering that the initial energy will remain constant throughout the entire process of division and expansion. Third Fundamental Law of PT shows that the sum of all granular energies in our closed Universe is constant over time (these fundamental laws do refer to any universe would be created, if

there were several). If we accept the Law of global energy conservation (energy assumed to be only of mechanical nature), it results that this constant value reflects the exact amount of energy all granules held at their emergence moment, which is equal to that of the primordial granule.

We may say in this context that the primordial energy did not exist. According to the formula (1), it has simply appeared from nothing, in form of space and matter. However, each of these components contains an equal amount of energy, but of different signs. A bit later, the energy of that primordial matter was split during a simple conservative process of division; it was actually transferred to an infinite number of granules, being transposed into their motion. The same process creates and expands the three-dimensional geometrical space - the place where all granules are moving - which contains the other half of the energy.

The hypothetical First Bang and the Big Bang(s) that followed are similar cosmic events; they gave "birth" to very similar systems (as structure and as functionality), called universes. However, three differences may be mentioned here:

1. *Localization*: FB occurred dispersively in a very large volume of the primary material, while BB represents a sudden expansion of a smaller quantity of the same material being in a highly compressed state (called singularity in many current theories).
2. *Scale*: FB is a global event, involving the *entire* primordial material that fluctuated, while BB engaged only a part of this material, gravitationally concentrated into a supermassive black hole of the Primary Universe [6].

3. *Speed*: FB was a relatively slow process, yet having certain acceleration, while BB is an instant explosion of granular matter.

These universes ("parent" and "child") have evolved very similarly, but the exact moment of the First Bang (when the process of granular division has just been completed) will be used as starting point to classify and characterize their future stages. Let us assume now that we are observers inside such a closed system called Universe. We must discover its specific laws of physics and establish precise units of measurement for the quantities involved. Some concrete systems of reference are also required to help us describe the motion, in either a relative or an absolute manner.

2.2. Universe - First Stage

We may imagine now the granular medium, shortly after its appearance: a cloud of free granules that are randomly moving at the same speed, constant over time. These granules in motion formed the omnidirectional, quasi-uniform granular fluxes, but any compact granular structures, such as elementary particles or photons, do not exist yet. On a slightly larger scale, all this can be seen as an amorphous substance of ultra-high-density (which decreases with space expansion), with no identifiable points or regions, with no marks. This fluid, which is made up of infinitesimally small granules, completely fills any available volume and dilates the three-dimensional space. The flow of time cannot be measured in this system, and there is no structured matter, neither mass nor energy with their current meanings. However, space does exist at that time, but we cannot measure

any length, we cannot establish a coordinate system and neither a direction of travel. The granular postulates (introduced by PT), all being valid at this moment, include terms such as mass, energy, impulse, but they are not used in their normal sense, as it was already stated. They are rather some reflections of the same terms employed by the macroscopic level physics, having similar meanings, but all were projected and adapted to the granular level. As we know for sure that there is movement, we automatically may use particular terms such as *relative* and *absolute*, having instead their usual meanings!

What can be said about the physical quantities at this stage?

1. *Granular space*: At first, the exact place where the Primary Universe appeared cannot be specified, the uniqueness of its emergence process prevent us from doing so. The same thing also applies to our Universe, the presumed "child": there is nothing to relate with in order to determine the position of its initial singularity. Space, as three-dimensional framework, does not yet exist at the moment of FB, but it was created immediately after that bang. We will further consider space as being a linear, uniform and isotropic frame, which is continuously expanding.

2. *Number of dimensions*: The primordial "nothingness" has an unknown number of dimensions; the derivate space and matter are three-dimensional things only in our perspective, as observers from inside the system. This aspect can be considered either as an illusion or as a geometric simplification, also because we cannot relate it to something similar.

3. *Movement*: It may be perceived if there are minimum two distinct material entities, by mutual referencing; but none of

them is really "fixed", it could only be considered as such in an acceptable simplification. At this very first stage, the granular movement may only be described in a global and relative manner, as granules against other identical granules, and therefore it cannot be clearly defined or localized in the system.

4. *Granular time*: As it was shown before, the flow of time can only be defined by association with space and matter (with its motion), as representation of the maximal internal rate of a material system. This rate derives from the speed of system's distinct parts that are moving or oscillating, and it actually identifies the sequences of organized matter movements. Therefore, at this stage and at this level, we may artificially introduce this kind of physical quantity, and only in relation to the granular movement at a constant speed. Since there is no other distinct system that could be used as reference, the granular time may have a unique and constant rate, arbitrarily established.

5. *Granular energy*: This type of energy can be seen as an infinitesimal part of the primordial matter's mechanical energy, which has been finally distributed to every granule, equally, through the division process.

6. *Mass*: As defined in PT, the mass property does not yet exist at this stage; it may only characterize solid granular structures, which will form later. However, we may intuitively give it the signification of *amount of substance* that each granule holds.

There are two types of physical quantities, both being related to the granular movement and being connected to each other:

- Speed, which would be given by the move on a hypothetical unit of length in a unit of granular time (a primary equation of granular physics), having the normal meaning;
- Energy / mass / momentum, with special significations at this level, and which have their own laws of conservation (PT).

These quantities and their laws represent the basis for any future transformation this system might be going through; thus, this very young universe seems to be deterministic and its evolution becomes predictable. At first sight, all quantities seem to contain a certain degree of *relative*, as long as they are associated to an almost infinite number of identical "objects" that are moving at the same speed. Their movement is distributed throughout the space (which is continuously expanding) on each and every possible direction. Therefore, neither marks, nor units of measurement could be really set in this "world" of no distinct entities and no stable bounds. There are many laws of physics applicable at this moment, having concrete formulas; but they may only apply theoretically, in an abstract manner, as long as any experimental verification is truly impossible.

Considering the way this system appeared and its evolution during the first stage, a certain degree of *absolute* may also be identified in the physical quantities described above. Where this attribute did come from? And what is its level?

- Firstly, this system is **unitary**, as it holds a *fixed quantity* of primordial material and a *fixed* amount of energy. All these things will be found in the speed and size each granule got at the end of the stage, when any granular quantity will become *constant*.

- This system is also **conservative**; its total amount of energy and impulse will be maintained over time.
- When the division process completes, this system will become **stable** as the size, speed and number of all its components will remain constant in time.
- The FB hypothesis assumes this system is **singular**.

Considering all these aspects, one or more physical quantities may be normally chosen to bear the attribute of *absolute*. They will be able to carry on the essence and the uniqueness of this initial system to the next stages, as any law of the granular physics will naturally extend to higher levels, providing the foundation for all the other laws of physics.

2.3. The Absolute Granular Velocity

At the end of the granular division process (a process that conserves global momentum), the granular speed got its final value - as PT has already shown; this superluminal speed **C** may therefore be considered an *absolute constant*. Each granule moves in any direction at this speed; we consider that this value would be measured from an absolute, stationary frame of reference, directly associated to our Universe. However, in order to correctly absolutize this speed and declare it as a universal constant, a few assumptions and postulates have to be made in addition to those already issued by PT:

1. All granules are exactly of same size, constant over time, and their collisions will always be perfectly elastic; the initial process of granular division is definitely finished.
2. The properties of the spatial geometric frame do not change over time, regardless of its expanding process.
3. The granular time is a hypothetical quantity assumed to have a constant rate. Its signification is not identical to that of the macroscopic time in material systems, but is similar; they both are associated to certain movements through space. This type of time has only been introduced to help us define the absolute and constant speed of the granular motion.

Note 1:

- Time and space (as geometric framework) at granular level are abstract physical quantities, a sort of linear "reflections" of the macroscopic quantities bearing the same names.

Note 2:

- Their presumed linearity allows us to operate further, at the quantum level and above, with the equivalent macroscopic quantities; therefore, the regular space and time are both considered intrinsically uniform. We may thus correctly quantify later their potential variability in relation to this default regularity of the basic, granular level quantities.