Fundamental physical constants

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1. Categorization

My previous books and articles have all shown the true nature of reality that surrounds us - confirming the granular model of a closed universe; they have also shown a profound relativization imposed to all physical quantities that describe it. As observers located inside this universe, we are using tools and measuring devices that have the same consistency and granularity as the observed matter; therefore, we will obviously face an objective limitation analyzing and probing the microcosmos. The observational uncertainty will affect any measurement performed under a certain dimensional scale, altering its value. At the quantum level, i.e. the realm where the elementary particles lie, it is all about movement, its particularities and about its associated laws and quantities. However, as it has already pointed out, all the rules and physical quantities from this dimensional level are in fact consequences of the motion existing at a lower, sub-quantum level. Here, at the granular level, lies in fact the whole mechanics that allows our Universe to function at any higher scale. We may find there the absoluteness of the motion, but also its inner relativization - if all things are regarded in their complex dynamics and since the beginning. The absoluteness originates from that unique source of matter we mentioned, the primordial essence. At *time zero*, the compact matter has turned into granular matter; this cosmic event has eventually imposed a directional equivalence and an almost perfect uniformity of the three-dimensional space, along with a constant value of the granular impulse/energy. That *intrinsic relativization* comes from the absence, after *time zero*, of any other marks that may still represent the stillness of the unique source of matter. On the other hand, we are also dealing with a subsequent *dimensional relativization*, characteristic to any material structure, which comes from the intrinsic one and from the closeness of our Universe. Therefore, it seems normal to look for a set of true fundamental physical quantities which may completely and absolutely describe the universe and the movement of its structured matter.

1. Considering the previously stated conditions [1], we could now assume the existence of a fixed initial amount of granular material, and therefore the granular number **N** will become an absolute constant of our Universe. To support this idea,

we have to additionally presume that the granular division has definitively ceased after *time zero* and that this phenomenon is irreversible (we can either include or not the division process into that initial moment, depending on the model we choose; however, we will consider here the most recent moment). This really big number **N** has been estimated in a previous article to at least a few googols, thus making our Universe a special large system, where many important data will only have statistical components.

2. As all the granules are identical in shape and size, we can associate them a constant diameter **d**, which, in the absence of any other fixed marks, could be considered as the basic unit of measure for length. If we assume that the initial shape of the essence was also spherical, its diameter **D** simply results as:

$$D = d \sqrt[3]{N}$$

3. Once the division process ended, all the granules have reached a constant, absolute speed, which will be further denoted by ***C***. This value of speed holds indefinitely, it is not affected at all by the number of granular collisions (all collisions are perfectly elastic).

4. As being a certain amount of matter in motion at constant speed, a granule will implicitly possess granular impulse (momentum) and granular energy (kinetic). These are fundamental, constant, absolute quantities that will be further denoted by $\overline{\boldsymbol{p}}$ (vector quantity) and respectively **e**. Note: in any isolated system of a fixed number of granules, these two physical quantities are subjected to the laws of conservation.

5. After that first cosmic event, the isolated system called universe has undergone a continuous process of expansion, starting from a sphere of an initial diameter **D**. We may assume that the absolute speed of its edge is lower than the speed ***C*** (the model of a closed universe), and therefore there were granular collisions that changed the granular impulses toward the inside of the sphere. It is equally possible that the wall of this sphere to "dissolves" itself, sending the granules toward the inside of the bubble. Any model we would take into consideration, these three statements are certain:

- At a global scale, there are no privileged granular directions; this declaration will simply lead to a basic granular postulate related to the quasi-null vector sum of all granular impulses.

- The granular density had a maximum value in the beginning (granules were very close to each other), then decreases with the geometrical expansion of space.

- There were small nonuniformities in this granular system; anyway, the entire system tends, at any scale would be regarded, to automatically increase in uniformity.

6. We could also define a granular time, a quantity derived from the granular speed and diameter, which would have a constant rate of passage. However, it would be a kind of virtual quantity, neither fundamental and nor very helpful to this set of constants.

7. The granular density, as well as the average intergranular distance, is not a constant quantity (as it was already described in [1]). Instead, both of them are very useful in some calculations (as of the pressure exerted by the granular fluid on compact structures) and they will be included in this basic set as $\boldsymbol{\rho}$ and respectively $\tilde{\boldsymbol{r}}$.

8. Certain granular gradients have appeared in space just after the bang moment ([6], Chapter 1). The granular collisions and the high density allow us to give a simple explanation on how the omnidirectional fluxes crossed these areas and formed many rotational, compact structures ([4], Chapter 3). All these new structures got stable shapes and sizes shortly, adapting continuously to the decrease of the granular density (to the pressure exerted by the spatial fluid). This decrease in density had two main causes:

- The formation of compact granular structures - the elementary particles - representing a significant percentage of all granular material, about 5...30%.

- The volumetric expansion of space, which automatically produces a "dilution" of the granular fluid.

The omnidirectional granular fluxes generate a well-known phenomenon called gravity and maintain the shape, size and stability of all elementary particles that spontaneously emerged during the period of high granular density. Considering their origin and the huge spatial volume where they were generated, these fluxes will be almost uniform at any scale.

We presumed only two stable shapes for the elementary particles (and their antiparticles), the flat disk (electrons, positrons and quarks) and the torus (neutrinos). However, there are some other stable formations, such as the gluons that bind a composite particle (two or three quarks) together, and some unstable ones. The side surfaces of the discoidal-type particles have a certain concavity; this geometric feature gives them the important "electric charge" property. Furthermore, all these particles execute an internal, continuous motion of precession characterized by the parameter called *spin.* These latter features lead to the emergence of some force fields around particles, namely the electric and magnetic fields. They can (all these fields are constituted of *electrophotons*) cause interactions at a distance, i.e. they may exert certain forces on other particles.

The regular photons, as well as the electrophotons, are granular structures of a specific shape (fixed or dynamic) that results from concentrated granular fluxes, but they are not compact formations. Therefore, they can only propagate through space at the maximum possible speed (which is influenced by the local granular density). The maximum speed of photons will be denoted by **c**; this derived quantity results from the granular speed ***C,*** the local granular density ***ρ*** (which also includes a certain probability) and the duration of a granular collision. The formula of the maximum speed through the empty space is (speed of light):

$$\mathbf{c = C / (1 + \rho \tau C)}$$

where **τ** is the average duration of a granular collision (it depends on the granular diameter and on the elasticity constant of the primordial material).

Any change of the granular density affects the intensity of the granular fluxes, i.e. the pressure exerted by space on all compact granular structures. The balance between the momentum transferred by the granular space and the

internal, rotational one, determines the shape and size of any elementary particle. These dimensions will modify some other quantities, such as the electric charges and therefore the strength of their electric fields. However, all these things are included in the global *relativization* that every physical quantity is always facing, one particular phenomenon that induces in turn certain *constancy* to all the values we can measure. It will be very difficult to work with the absolute values of the fundamental physical quantities, but this thing could bring us much closer to their physical significance.

9. As it has already been described in my first book [1], the quantity named *mass* can be interpreted as the amount of external impulse required to change the state of motion (in fact the internal impulse) of a certain particle. Obviously, the mass of a particle primarily depends on the number of constitutive granules and on the value of the granular impulse. However, the movement of a particle is quite complex, being in fact a combination of internal precession and external translation/rotation (produced by the nearby fields). This re-orientation of all internal impulses will change, in the local frame of reference, the ratio between the rotational movement and the translational one (global, averaged, absolute). The "speed" at which this particle will interact with the other ones (through various fields) will change in this way, and this is equivalent to a decrease of the rate of local time. This relativistic phenomenon also involves the increase of the particle's mass (through the mechanism described above), which will be cumulatively reflected at the macroscopic level. We may actually redefine relativity (the one coming from the movement of any material structure) as a change of the internal balance between the *absolute* (internal movement) and *relative* (external one).

10. In principle, *mass* may only characterize a structured granular formation whose density is higher than the local one; therefore, it is natural to see the *energy* associated with this mass as a structured formation of granular energies. Any particle has a certain amount of mechanical energy (kinetic energy) and its movement through the granular fluid changes the ratio in which this energy divides into rotational (internal) and translational (external) kinds. The eventual acceleration caused by a field to a particle means the action of a certain force

whose magnitude is given by the amount of momentum transferred in the unit of time. The energy is neither created nor destroyed at the granular level, it only changes its structural configuration at a given moment, concentrating in various particles or fields.

2. Conclusion

We have identified eight fundamental physical quantities that fully characterize our Universe at the granular level: **N**, **d**, ***C***, $\overline{\boldsymbol{p}}$, **e**, **τ**, ***ρ*** and $\tilde{\boldsymbol{r}}$; first six quantities are fundamental physical constants, while the last two are correlated and they both are depending on the expansion of space. The granular diameter **d** could constitute itself a distinct unit of measure which could characterize the global relativization within this universe. We may imagine some complex models that would include all these constants; any type of particle, atom, field, photon may be completely described by these models and we may deduce all their derived quantum properties. Normally, any other physical quantity should be somehow connected via certain mathematical formulas with these defining constants, at any scale. These eight constants are therefore completely giving our granular Universe and its actual dynamics.

3. References

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[6] Laurențiu Mihăescu, 2017. *The first bangs*, article