The shape of elementary particles

Fluidity and stability

Laurențiu Mihăescu

Bucharest, Romania

Second Edition, February, 2019

www.1theory.com

Table of contents

1. The shape and stability of elementary particles

As it was previously shown in "*The formation of elementary particles*"[4], the elementary particles are granular structures that have, in a uniform space, well-defined and stable shapes. Their size and the number of component granules are only depending on the granular density of space. Figure 1 (the upper part) shows a few sections through generic elementary particles (already described), simple pictures in which no precise scale factor was used. The shapes of these generic discoidal and toroidal structures ensure their perfect stability in time, whether we consider the free particles or those belonging to composite formations (the bottom part of the figure, where a meson and a proton are represented).

Any interaction that may exist between these particles is caused by the local granular flux. This flux generates all the known fields and creates, as a final result, the forces that are exerted between adjacent particles. It should be noted that all these particles, composite or not, are executing their own precession movement - and this is due to the internal granular motion and to its special features.

Two elementary particles, the electron (top, blue) and the positron (bottom, red), are represented (a section and a side view) in Figure 2. The concavity of their side areas determines the type of their electric charge, as previously stated in my theory [1], establishing the direction of the electric fields they will emit continuously (Figure 3).

2. Characteristics

1. The form of all free elementary particles that are lying within a uniform flux is perfectly *symmetrical.*

2. Their geometric shape is given by a particular surface of revolution, in fact by a *regular closed* surface that has been rotated around an axis.

3. The particle's surfaces are *smooth*, their radius of curvature being always bigger than a threshold value.

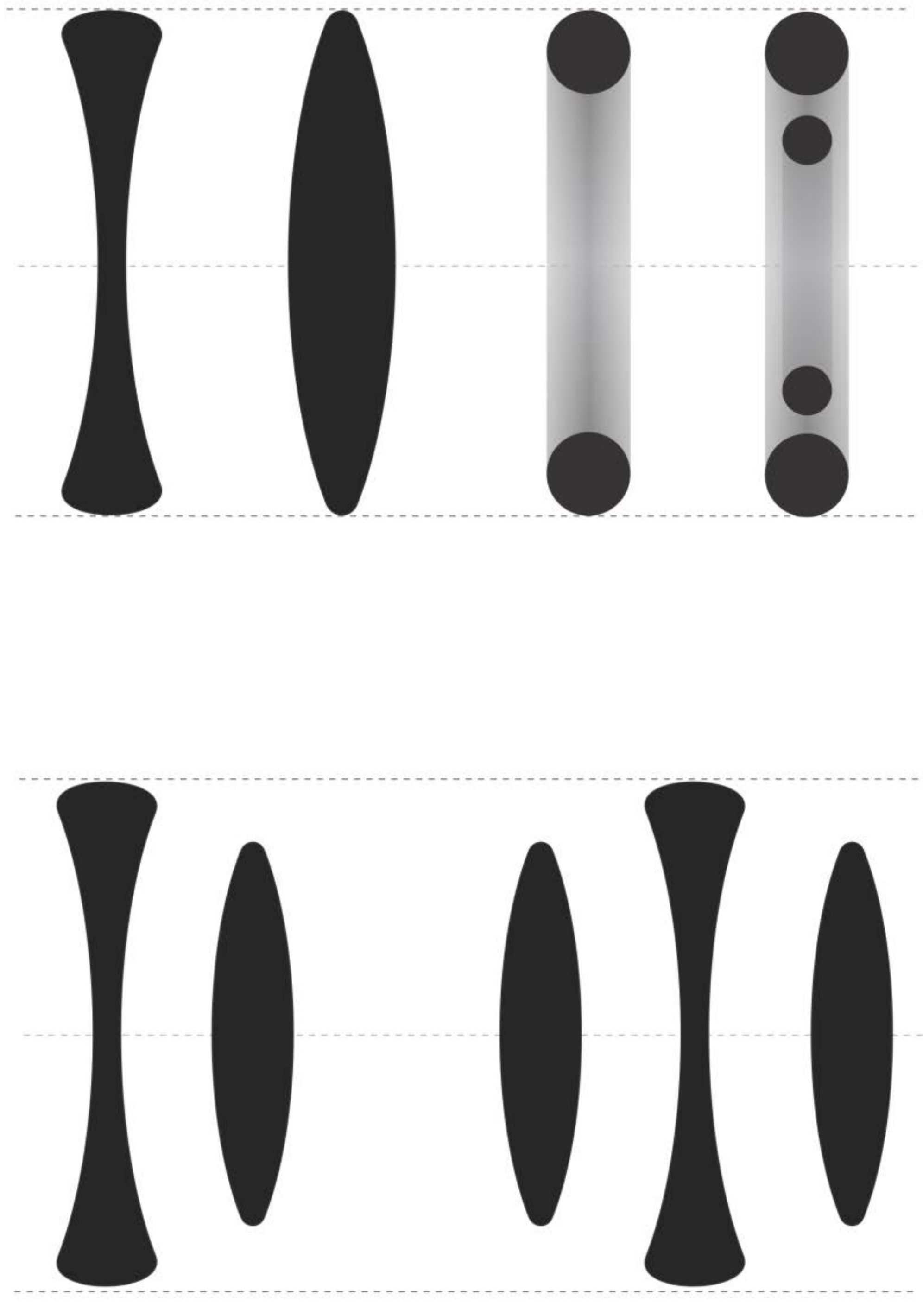

Figure 1 - *Generic types of elementary and composite particles*

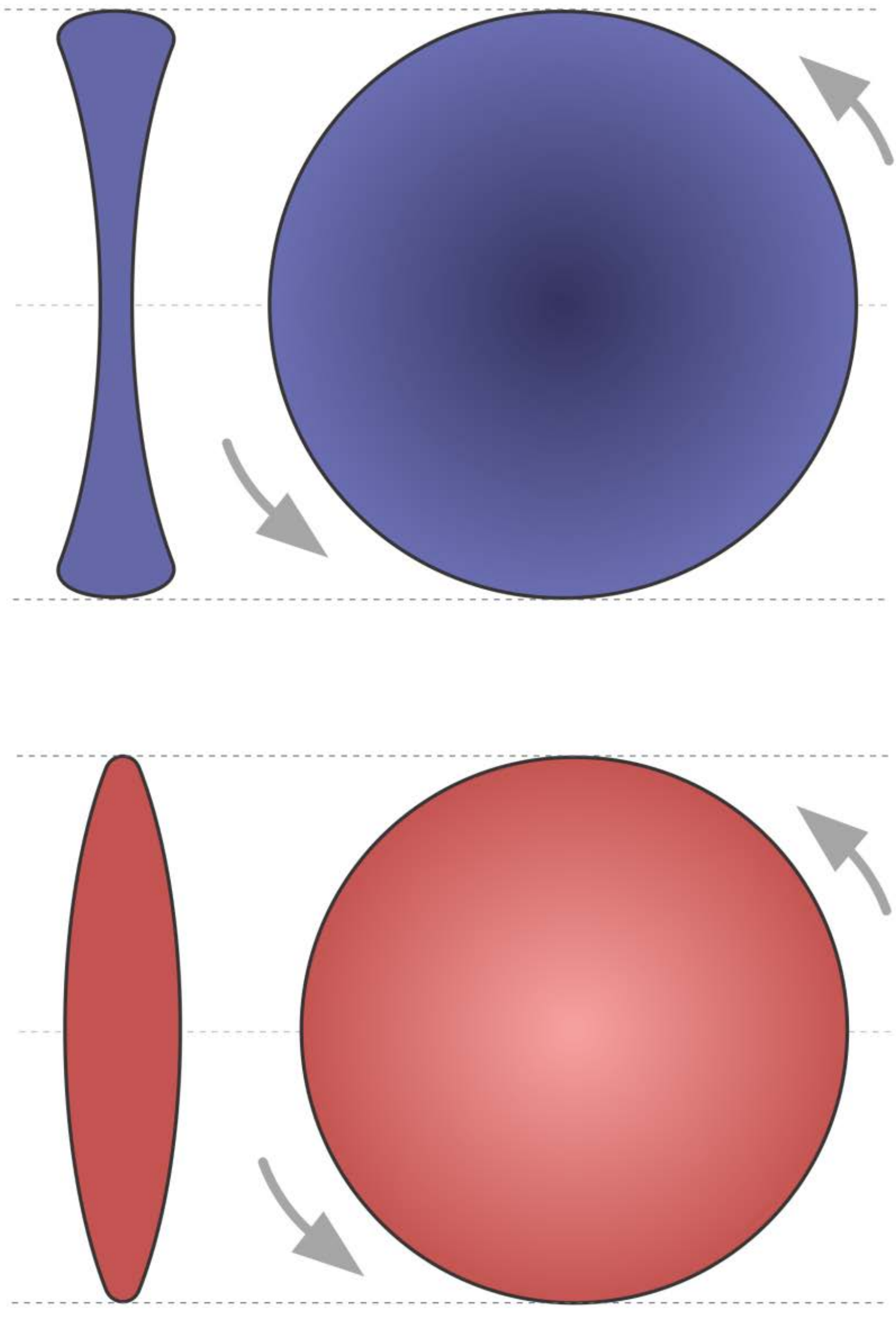

Figure 2 - *The electron and the positron*

4. Considering their internal structure - granular layers that are practically bond together and that may slip past each other without "friction" - all particles will act as a *viscous fluid* with a certain surface tension (if we are using some terms of fluid mechanics). This thing will lead to a number of interesting properties, especially in the case of composite particles:

- Distinct granular layers can "store" the direction of their motion, imposing in this way different global directions during the two revolutions any particle makes for a complete rotation in its precession movement.

- The elasticity given by the internal granular structure may allow different temporary deformations to elementary particles, within certain limits, under the action of powerful fluxes. Just as speculation, the electrically charged particle's surface may flatten (and increase in diameter) at high, relativistic speeds. This important effect could occur during the time interval a photon is generated and emitted.

- A significant deformation is produced by the gluonic field (colored in dark gray) to the side quarks of a neutron (see Figure 4, the particle from the bottom). This deformation, which is also called "color charge" in the quantum chromodynamics language, changes, practically cancels the electrical charge of those two quarks. The electrophotons they are continuously emitting will also be deformed, producing no field effects for this reason.

- In some special cases (intense fluxes or collisions between particles), a particle may transform into another one; the total momentum, electric charge and granular mass are all conserved in the process. The elasticity property allows a particle to split up into smaller pieces, if the disruptive force is acting symmetrically in a central zone (this is the case of a free neutron, one of its side quarks eventually decays into an electron and an antineutrino).

We have to describe now the pushing forces that are generated by the local flux on its contact with particles, e.g. with an electron (Figure 5). As multiples of the gravitational unitary force, these forces create a dynamic balance with the internal "pressure" generated by the granular impulses, all over the particle's surface.

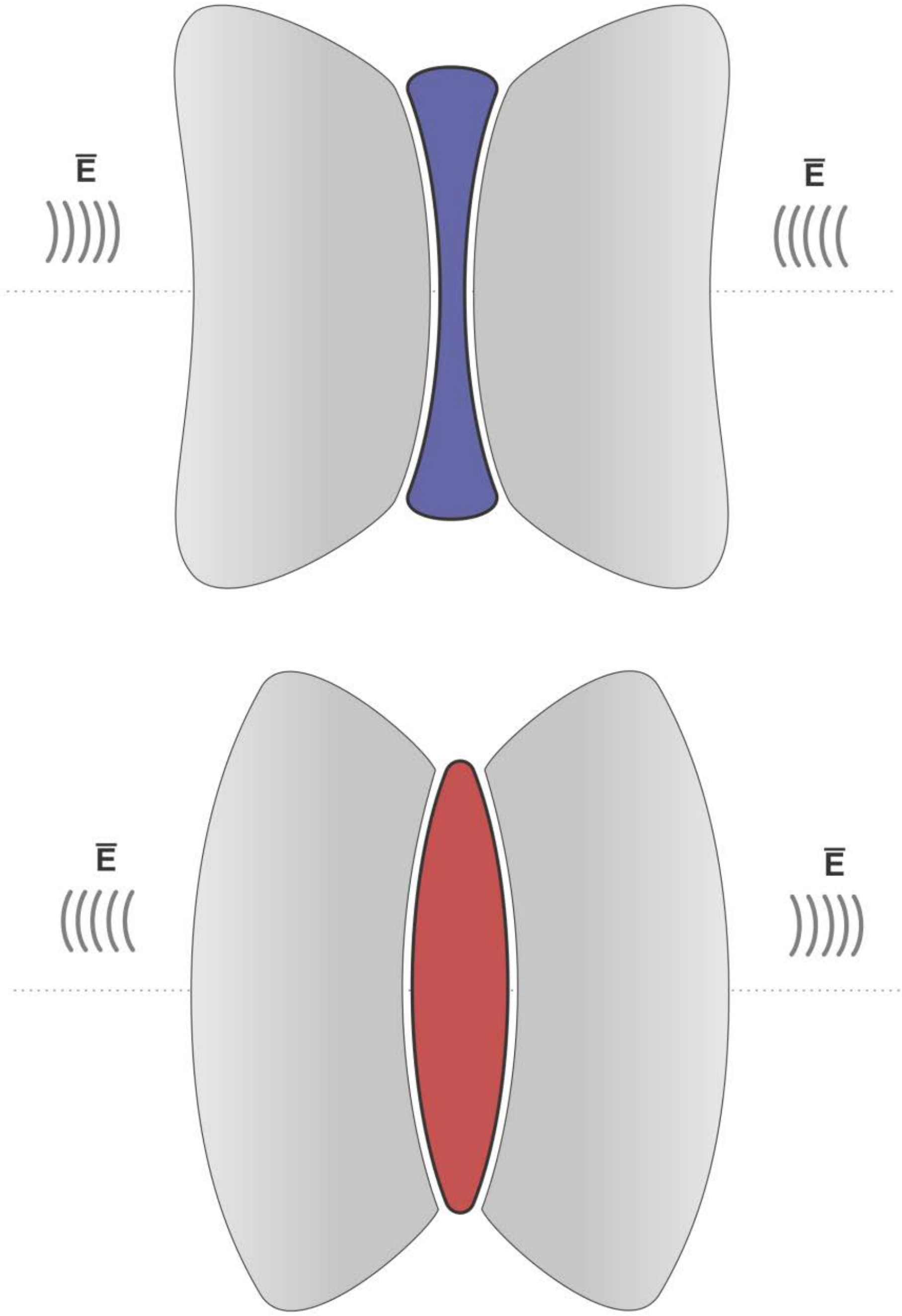

Figure 3 - *The electric fields of electrons and positrons*

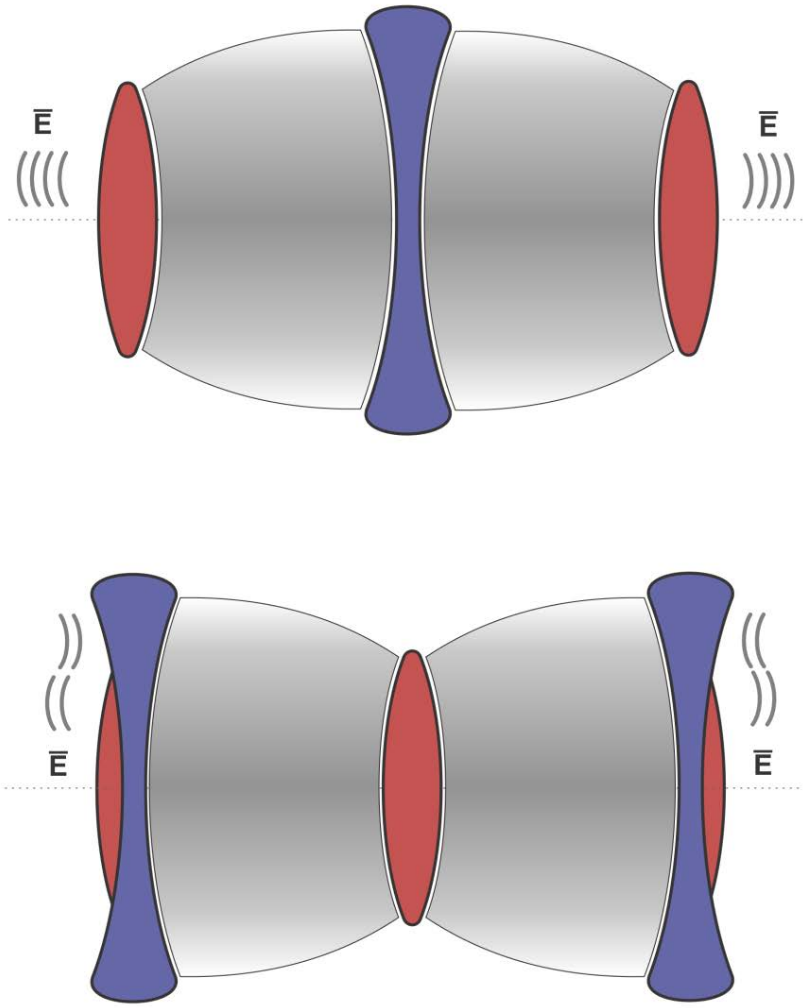

Figure 4 - *The internal structure of protons and neutrons*

Their scalar expressions are of this form (k_1 and k_2 are two constants and all the surfaces are considered plane):

$$\mathbf{F_1 = k_1 * d_1 * F_u}$$

$$\mathbf{F_2 = k_2 * (d_2)^2 * F_u}$$

The force $\mathbf{F_1}$ equilibrates an internal force of centrifugal kind, which is generated by the granular impulses that have to be modified in order to maintain the quasi-circular trajectories for all internal granules - from the axial region up to the edges. $\mathbf{F_2}$ balances an elastic force produced by those compressed granular layers (of larger areas) which have the tendency to move away from each other and to increase the thickness of the particle. A more detailed analysis can only be performed on a complete model, on a three-dimensional simulation, especially designed for the generic particles that are subjected to a constant external "pressure".

The electric charge of the elementary particles - meaning the concavity of their side surfaces - has to be analyzed in the same manner. If the granular medium is uniform, both sides of the particles have identical concavities and these curvatures are maintained for an indefinite period of time. But how is determined the exact type of concavity at the moment a particle (or an antiparticle) emerged, which is the mechanism behind its biconcave or biconvex shape? The answer should contain at least two parts, considering the way in which particles have formed: one by one, as in the first moments of the universe, or in pairs, as a gamma photon generates now, for example. However, both cases involve the same "mechanics": one granular vortex is increasingly compressing and eventually reaches a compact discoidal form.

In the first case, we can speak of randomness. The discoidal structure, which may start as a squashed cylinder with flat side surfaces, is pressed on the narrow edge ($\mathbf{F_1}$) and, consequently, its side surfaces are curving until a dynamic balance is reached. The final inward or outward curvature is a pure random outcome, the probability of each type of surface to appear seems to be 50% (we can make a mechanical analogy: the embryonic particle is like a drum; if this musical instrument is evenly pressed on the rigid body, its membranes will either curve upward or downward).

In the second case, we can speak of a certain degree of determinism. For a simple mechanical reason, the two particles will have different concavities (polarities, and this leads to the conservation of charge). The granular medium is very dense, as in the previous case. However, there is one different thing, which eventually determines the positive (for example) particle from the pair: the source that generated the gamma photon, i.e. its intrinsic polarity. As we already know, all layers composing a photon body naturally inherit and transport the concavity of the emitting particle's surface.

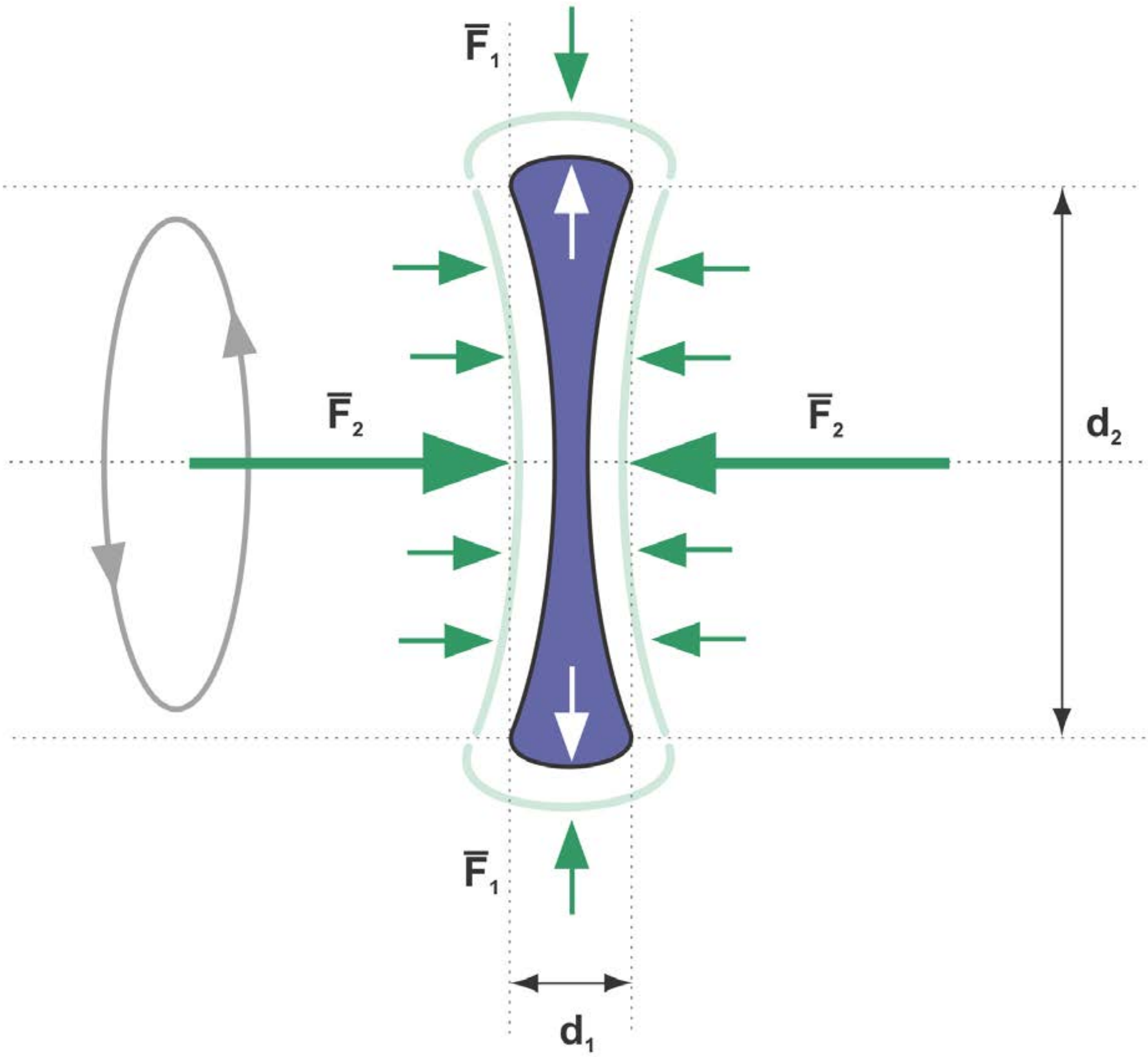

Figure 5 - *Internal and external granular forces*

3. References

[1] Laurentiu Mihaescu, 2014. *Prime Theory*, Premius Publishing House

[2] Laurentiu Mihaescu, 2016. *The Universe*, Premius Publishing House

[3] Laurentiu Mihaescu, 2016, *The Theory of granular gravity*, article

[4] Laurentiu Mihaescu, 2017, *The formation of elementary particles*, article

[5] Laurentiu Mihaescu, 2016, *The First Bangs*, article