A Latently Quantized Force of Atomic Unification

Rasulkhozha S. Sharafiddinov

**Institute of Nuclear Physics, Uzbekistan Academy of Sciences,
Ulugbek, Tashkent 100214, Uzbekistan**

Abstract

Given the availability of a force of atomic unification, a sharp interconnection between an antineutrino and a neutron must constitute an antineutrino hydrogen atom. This is one of two atoms that are of crucial value for constructing all of the remaining ones. We discuss a theory in which atomic orbit quantization around a nucleus is carried out with a flavor type dependence. Such an orbit quantized sequence principle leads to the splitting of the spectral lines of atoms in an external field, confirming the availability of a family structure in them. Thereby, it predicts the existence in nature of 63189 isotope forms of 118 types of atomic systems. We derive the united equations that relate the masses in an atom to the radii of boson, lepton, and antineutrino orbits including the speeds, energies, and revolution periods of their particles. The estimates thus found express, for each of the five forms of uranium and the two types of hydrogen, the idea of an intraatomic force quantized by leptonic families. They unite all of connections necessary for the steadiness and completeness of an atom in a unified whole as a role of gravity in atomic construction. Therefore, a change in both the lifetime and radius of any of the structural particles within an atom originates from the orbit type dependence.

Key words: An Al-Fargoniy Antineutrino Hydrogen; An Orbit Quantized Sequence; Family Structure of Atoms; Mass Criterion for Atomic Unification; The Boson, Lepton, and Antineutrino Orbits; An Al-Fargoniy Neutrino Antihydrogen; Atomic Unification Theorems; Orbit Quantization Law; Gravity in Atomic Construction; Latent Dynamics of Atomic Energy.

1. Introduction

The classical planetary model of an atom suggested by Rutherford [1] may be logically based on the absence in nature of absolutely straight-line motion. Such a nonclassical connection responsible for the periodic revolution of electrons around the nucleus appears in an atom as one of the highly important consequences of the mass-charge duality [2] principle.

In this framework, each of the electric (E), weak (W), strong (S), and other innate types of charges is connected with the availability of a kind of inertial mass. The masses and charges of an elementary object (s) must be considered as constituting a united rest mass m_s^U and a united charge e_s^U, which include all of the masses and charges of the object in the forms

$$m_s = m_s^U = m_s^E + m_s^W + m_s^S + ..., \tag{1}$$

$$e_s = e_s^U = e_s^E + e_s^W + e_s^S + ... \tag{2}$$

at a grand unification of forces [3], the group of which describes the gravity at a latent quantum level, namely, a level of its latently quantized force. Of course, we have mentioned here that all components of charge e_s in Eq. (2) follow from the unified gauge group [3] allowing them to constitute the naturally united (U) charge.

These structural sizes reflect the coexistence of a Newton force of gravity $F_{N_{ss}}$ between two particles and a Coulomb force $F_{C_{ss}}$ between the same objects, which may be expressed from the point of view of any of the existing types ($K = E$, W, S, ...) of actions:

$$F^K_{N_{ss}} = G_N \left(\frac{m^K_s}{r}\right)^2, \quad F^K_{C_{ss}} = \frac{1}{4\pi\epsilon_0}\left(\frac{e^K_s}{r}\right)^2, \tag{3}$$

$$F^{ij}_{N_{ss}} = G_N \frac{m^i_s m^j_s}{r^2}, \quad F^{ij}_{C_{ss}} = \frac{1}{4\pi\epsilon_0}\frac{e^i_s e^j_s}{r^2}, \tag{4}$$

where $i, \ j = K \ (i \neq j)$, r denotes the distance between the objects, and G_N is a gravitational constant.

This in turn implies [3] that each of the electric F^E_{ss}, weak F^W_{ss}, strong F^S_{ss}, and other possible types of forces includes not only a kind of Coulomb $F^K_{C_{ss}}$ part but also a kind of Newton $F^K_{N_{ss}}$ part:

$$F^K_{ss} = F^K_{N_{ss}} + F^K_{C_{ss}}, \tag{5}$$

$$F^{ij}_{ss} = F^{ij}_{N_{ss}} + F^{ij}_{C_{ss}}. \tag{6}$$

Given the availability of an interratio of any Newton-Coulomb pair of similar forces, the field corresponding to each of the components of the united force F^U_{ss}, which is equal to

$$F^U_{ss} = F^E_{ss} + F^W_{ss} + F^S_{ss} + ..., \tag{7}$$

becomes a naturally warping [3] field, confirming that neither of forces F^K_{ss} has the characteristic of any freedom. Therefore, the electron motion carried out in a formation of atomic system is orbital in nature such as the periodic revolution of planets around the Sun. In them, some latent connections consequently appear. Their nature defines the behavior of the structural objects of both an atom and a solar system at the fundamental dynamical level.

However, as was stated in classical electrodynamics, neither of electrons revolving around the nucleus cannot remain in orbit for a long time without loss of its energy. At the same time, nature itself unites all parts of ordinary matter as a unified whole. It relates herewith each electron to a nucleus, confirming the availability of a stable atomic system.

In the atomic model based on the postulates of Bohr [4], it has usually been assumed that in an atom, there exist stationary orbits quantized by angular momenta

$$mv_n r_n = n\hbar, \quad n = 1, 2, 3, ..., \tag{8}$$

and the transitions of an orbital electron of mass m from a higher (lower) level to a lower (higher) level originate from photon emission (absorption) laws, with a corresponding energy equal to the difference between the energy levels.

For defining the speed v of an electron and the radius r of its orbit in an atom, the second most important equation, as suggested by Bohr, is the equality

$$\frac{mv^2}{r} - \frac{1}{4\pi\epsilon_0}\frac{Ze^2}{r^2} = 0 \tag{9}$$

in which $Z|e|$ is the charge of the atomic nucleus.

When Eq. (9) is united with Eq. (8) at $v_n = v$ and $r_n = r$, one can find solutions that relate the structural parameters v and r to Z, α, and n in the forms

$$v = \frac{Z\alpha}{n}c, \quad r = \frac{n^2}{Z\alpha}\frac{\hbar}{mc}. \tag{10}$$

According to these results, at large values of mass m, the intraatomic forces have the property of attraction, whereas repulsion appears in the mass smallness dependence. Such an order would seem to say about that the atomic construction is not in line with laws of a solar system.

On the other hand, as follows from Eqs. (8) and (9), the development, on their basis, of the first-initial planetary model of an atom has neither a classical nor a quantum character. It expresses of course the idea expressed by Bohr about atoms of a hydrogen-like nature and thus gives an explanation of a most simple matter. For the case when the atomic system suffers a spontaneous change in its compound structure, the latter encounters problems connected with the implications of so far unobserved latent regularity of a unified nature of all types of atoms.

Furthermore, under the action of an external electric or magnetic field, the Bohr orbits suffer at first a strong change in their energy levels and, next, split into different states, observed as an expansion of the spectral lines. Thus, for the Bohr model of an atom, in an external field, even the spectral lines of hydrogen split, thereby postulating that the same electron may simultaneously revolve around its nucleus in the most diverse orbits.

Based on the explicit contradictions mentioned here, one might think that, unlike a solar system, the atomic construction in nature is based on the Zitterbewegung motion. If we start with a simultaneous uncertainty of the radius Δr and of the speed Δv, assuming that Eqs. (8) and (10) must lead to the relationship

$$\Delta r \Delta v = \frac{\hbar}{m}, \tag{11}$$

we would introduce the notion of orbitals instead of orbits.

An orbital is a function depending on the coordinates of an electron. From its point of view, the intraatomic motion of an electron has no trajectory. Thereby, it allows one to follow the maximal probability of finding an electron in an uncertain region of space around the nucleus. But, as will be seen from the further, the motion of an electron within an atom becomes Zitterbewegung motion owing to an intraatomic transition between the left (right) and right (left) corresponding in a system to spontaneous mirror symmetry violation. Of course, nobody has observed a left (right)-handed electron itself in orbit of a hydrogen atom, and the influence of an electric or a magnetic field on its spectrum simply implies that neither the Stark [5] nor the Zeeman [6] phenomenon is connected with the implications of any phenomenological theories based on the absence of a role of gravity in atomic construction.

The notion of orbits, however, does not lose the thought in the presence of gravity. Therefore, it was introduced for the first time into atomic physics by Rutherford [1] as an intraatomic force of attraction responsible for the formation of an atom with an electron exhibiting orbital motion around its nucleus. We must not confuse the names. An orbit refers to a trajectory describing the intraatomic motion of an electron. An orbital refers to what is present in orbit or appears in an object of this orbit.

One of the most highlighted features of atomic systems is their neutrality, whereby the steadiness of each orbit is fully compatible with lepton universality [7-10] expressing [11] the ideas of not only charge conservation or charge quantization but also flavor symmetry [12,13] laws. Consequently, any electron knows about the presence in an atom of a kind of antineutrino. They can therefore constitute in orbit the left (right)-handed electronic bosons, each of which unites the left (right)-handed electron and its right (left)-handed antineutrino.

Their presence in turn has a crucial value for the establishment in nature of a true picture of the spectral lines of any of the corresponding types of atoms and thereby describes a situation when around each electron, which moves around a nucleus, revolves in orbit of this lepton of its own antineutrino.

Another important consequence implied by the mass-charge duality principle is that the crossing of spectra of electric and weak types of elementary particle masses corresponds in nature to the existence of the lightest lepton and its neutrino. They admit herewith the flavor symmetrical decays of an electron [14], which were not known before the creation of the first-initial planetary model of an atom.

These facts indicate that between the atomic system and the oldest theory of its nature, there exists a range of structural contradictions, which, in principle, require one to move away from the earlier representations of atoms using their existence, birth, and interconversion as a unity of symmetry laws.

Therefore, our purpose in this work is to raise the question of a truly quantum mechanical nature of an atom, namely, a mass-charge structure of an atom having a logically consistent mathematical formulation and allowing us to follow the logic of atomic systems including the dynamical origination of their spontaneous structural change. This new theory of an atom with orbits quantized by leptonic families establishes a true picture of all types of atoms and a role in their formation of mass and charge and thereby reveals so far unknown most diverse properties of atomic unification.

2. Mass criterion for atomic unification

The mass-charge duality [2] principle comes forward in an atom as a criterion for unification of its structural particles at a latent quantum level that lepton universality implies [11] a constancy of the size

$$m_s^E m_s^W = const \tag{12}$$

corresponding in nature to a coincidence [14] of electric and weak components of mass of the same lightest lepton. Such a lepton ($s = l$), according to the relationship

$$(m_\epsilon^K)^2 = m_\epsilon^E m_\epsilon^W = m_l^E m_l^W = const, \tag{13}$$

may be an evrmion (ϵ) possessing the electric mass and charge

$$m_\epsilon^K = 162.22857 \text{ eV}, \tag{14}$$

$$e_\epsilon^E = 1.602 \cdot 10^{-19} \text{ C}, \tag{15}$$

which are the fundamental physical parameters

$$m_0^E = m_\epsilon^E, \quad e_0^E = e_\epsilon^E. \tag{16}$$

These implications of lepton universality refer to any type of particle with an evrmion charge. If one of them is the well known proton (p), then there exists [14] the relation between the masses

$$(m_\epsilon^K)^2 = m_l^E m_l^W = m_p^E m_p^W. \tag{17}$$

The mass of each particle unites in addition all conservation laws in a unified whole. Thereby, it says about a situation [14] when an evrmion has its own neutrino.

To this conclusion, one can also lead by another way starting from the mass-charge duality [2], according to which, neutrino universality [15] expresses a constancy of multiplier

$$m_{\nu_l}^E m_{\nu_l}^W = const, \tag{18}$$

confirming the identicality [14] of electric and weak types of masses of the same lightest neutrino. Such a neutrino, as stated in

$$(m^K_{\nu_\epsilon})^2 = m^E_{\nu_\epsilon} m^W_{\nu_\epsilon} = m^E_{\nu_l} m^W_{\nu_l} = const, \tag{19}$$

corresponds in spectra of masses to an evrmion. The charge [14,16] and mass of an evrmionic neutrino

$$m^K_{\nu_\epsilon} < 7.2550823 \cdot 10^{-5} \text{ eV}, \tag{20}$$

$$e^E_{\nu_\epsilon} < 2 \cdot 10^{-13} \text{ e}^{\text{E}}_0 \tag{21}$$

referring herewith to fundamental constants are characteristic only for those particles in which mass and charge are not comparable with the evrmion mass and charge.

One such an object may, as was noted in [12] for the first time, be a neutron. But unlike the earlier presentations about unification of elementary objects, their classification with respect to C-operation allows one to establish one more highly important identity

$$(m^K_{\nu_\epsilon})^2 = m^E_{\nu_l} m^W_{\nu_l} = m^E_n m^W_n, \tag{22}$$

which indicates the equality [14,17] of the neutron (n) and neutrino charges

$$e_{n^-} = e_{\nu_l}, \quad e_{n^+} = e_{\bar{\nu}_l}. \tag{23}$$

Thus, the mass requires one at a given stage to characterize any particle by the four ($l = \epsilon$, e, μ, τ, ...) lepton flavors

$$L_l = \begin{cases} +1 & \text{for} \quad l^-_L, \quad l^-_R, \quad \nu_{lL}, \quad \nu_{lR}, \\ -1 & \text{for} \quad l^+_R, \quad l^+_L, \quad \bar{\nu}_{lR}, \quad \bar{\nu}_{lL}, \\ \ \ 0 & \text{for} \quad \text{remaining particles.} \end{cases} \tag{24}$$

The presence of only an electron e^- in orbit O_e is, as mentioned above, incompatible with the conservation of the full lepton number

$$L_\epsilon + L_e + L_\mu + L_\tau = const \tag{25}$$

and of all forms of lepton flavors

$$L_l = const, \tag{26}$$

responsible for the formation [18] of an electronic string from four types of left- or right-handed flavor symmetrical leptonic strings

$$(l^-_L, \bar{\nu}_{lR}), \quad (l^-_R, \bar{\nu}_{lL}). \tag{27}$$

Therefore, from the point of view of a unity of atomic systems and symmetry laws, each of Eqs. (17) and (22) must be interpreted as an indication to the existence in an atom of left- and right-handed flavor symmetrical boson and flavor antisymmetrical ($L_l \neq const$) lepton and antineutrino orbits quantized by leptonic families. In other words, the nature of atomic system has been created so that to any type of lepton flavor corresponds a kind of left (right)-handed orbit.

However, as we have seen, the evrmionic family has an extremely lower electric mass and that, consequently, the left- and right-handed evrmionic strings

$$(\epsilon^-_L, \bar{\nu}_{\epsilon R}), \quad (\epsilon^-_R, \bar{\nu}_{\epsilon L}) \tag{28}$$

move around the nucleus in the first left-handed ($O^L_{\epsilon\bar{\nu}_\epsilon}$) and second right-handed ($O^R_{\epsilon\bar{\nu}_\epsilon}$) orbits.

The third left-handed ($O^L_{e\bar{\nu}_e}$) and fourth right-handed ($O^R_{e\bar{\nu}_e}$) orbits refer to left- and right-handed structural states of electronic bosons, respectively:

$$(e^-_L, \bar{\nu}_{eR}), \quad (e^-_R, \bar{\nu}_{eL}). \tag{29}$$

The muons and their antineutrinos forming the left- and right-handed muonic strings

$$(\mu^-_L, \bar{\nu}_{\mu R}), \quad (\mu^-_R, \bar{\nu}_{\mu L}) \tag{30}$$

are of the fifth left-handed ($O^L_{\mu\bar{\nu}_\mu}$) and sixth right-handed ($O^R_{\mu\bar{\nu}_\mu}$) orbits of an atom.

Among the best known families of leptons, only the τ-leptons possess a large electric mass, and therefore, the seventh left-handed ($O^L_{\tau\bar{\nu}_\tau}$) and eighth right-handed ($O^R_{\tau\bar{\nu}_\tau}$) orbits correspond in an atom to τ-leptons and their antineutrinos, namely, to left- and right-handed tauonic bosons

$$(\tau^-_L, \bar{\nu}_{\tau R}), \quad (\tau^-_R, \bar{\nu}_{\tau L}). \tag{31}$$

It is already clear from the foregoing that the string orbits

$$O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e}, \quad O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O^L_{\tau\bar{\nu}_\tau}, \quad O^R_{\tau\bar{\nu}_\tau} \tag{32}$$

satisfying the inequalities

$$m^E_\epsilon < m^E_e < m^E_\mu < m^E_p < m^E_\tau, \tag{33}$$

$$m^E_{\nu_\epsilon} < m^E_{\nu_e} < m^E_{\nu_\mu} < m^E_{\nu_\tau} < m^E_n \tag{34}$$

appear in the mass dependence of leptonic bosons.

But an order such as (32) exists only for those atoms in which a nucleus consists of nucleons with an equal ($Z = N$) number of protons and neutrons. Therefore, to include in the discussion atomic systems with an unequal ($Z \neq N$) number of neutrons (N) and protons (Z), we must at first recall the baryon number [19] conservation law stating that the nucleons (antinucleons) have a positive (negative) unity $[+1(-1)]$ baryon (B) charge. Then it is possible, for example, that the neutrons ($n^-_{L,R}$) and antiprotons ($p^+_{R,L}$) constitute, at $N = Z$, the left- and right-handed hadronic strings

$$(n^-_L, p^+_R), \quad (n^-_R, p^+_L) \tag{35}$$

responsible for the bosonic structure of spinless nuclei without isospin as well as for their baryon symmetrical ($B = const$) picture.

Simultaneously, as is easy to see, between an atomic system and nuclear matter there exists a range of innate symmetries, the unity of which expresses, for all types of atoms, the idea of the same unified principle that

$$L_l + B = const. \tag{36}$$

This united regularity in turn gives the right to apply to the case when $Z > N$. At such a choice of the atomic nucleus, the left- and right-handed evrmions revolve around it in the first left-handed (O^L_ϵ) and second right-handed (O^R_ϵ) orbits. The third left-handed (O^L_e) and fourth right-handed (O^R_e) orbits correspond to left- and right-handed electrons. The fifth left-handed (O^L_μ) and sixth right-handed (O^R_μ) orbits of these types of atoms doubtlessly refer to left- and right-handed muons. Only the seventh left-handed (O^L_τ) and eighth right-handed (O^R_τ) orbits remain for left- and right-handed τ-leptons.

It is clear, however, that the lepton orbits

$$O^L_\epsilon, \quad O^R_\epsilon, \quad O^L_e, \quad O^R_e, \quad O^L_\mu, \quad O^R_\mu, \quad O^L_\tau, \quad O^R_\tau \tag{37}$$

in an atom appear as the difference of masses (14) and

$$m_e^E = 0.51 \text{ MeV}, \quad m_\mu^E = 105.658 \text{ MeV}, \quad m_\tau^E = 1776.99 \text{ MeV}, \tag{38}$$

$$m_e^W = 5.15 \cdot 10^{-2} \text{ eV}, \quad m_\mu^W = 2.49 \cdot 10^{-4} \text{ eV}, \quad m_\tau^W = 1.48 \cdot 10^{-5} \text{ eV} \tag{39}$$

implied [14,20] from the laboratory facts.

If one chooses a neutron number $N > Z$, at which atomic system construction is not quite in line with ideas of Eq. (36), then when neutrino universality leads to Eqs. (23), the summed charge is

$$e_{n^-_{L,R}} + e_{\bar{\nu}_{lR,L}} = 0,$$

which permits the right- and left-handed evrmionic antineutrinos to revolve around the nucleus in the first left-handed ($O^L_{\bar{\nu}_\epsilon}$) and second right-handed ($O^R_{\bar{\nu}_\epsilon}$) orbits. The right- and left-handed electronic antineutrinos are of the third left-handed ($O^L_{\bar{\nu}_e}$) and fourth right-handed ($O^R_{\bar{\nu}_e}$) orbits of the discussed types of atoms. The fifth left-handed ($O^L_{\bar{\nu}_\mu}$) and sixth right-handed ($O^R_{\bar{\nu}_\mu}$) orbits correspond to right- and left-handed muonic antineutrinos. Insofar as the right- and left-handed tauonic antineutrinos are concerned, they move around the nucleus in the seventh left-handed ($O^L_{\bar{\nu}_\tau}$) and eighth right-handed ($O^R_{\bar{\nu}_\tau}$) orbits. Formulating more concretely, one can represent the antineutrino orbits in the framework [14,20] of a spectrum of masses (20) and

$$m_{\nu_e}^E < 2.5 \text{ eV}, \quad m_{\nu_\mu}^E < 0.17 \text{ MeV}, \quad m_{\nu_\tau}^E < 18.2 \text{ MeV} \tag{40}$$

$$m_{\nu_e}^W < 2.1 \cdot 10^{-9} \text{ eV}, \quad m_{\nu_\mu}^W < 3.096 \cdot 10^{-14} \text{ eV}, \quad m_{\nu_\tau}^W < 2.89 \cdot 10^{-16} \text{ eV} \tag{41}$$

by the following manner:

$$O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O^L_{\bar{\nu}_\tau}, \quad O^R_{\bar{\nu}_\tau}. \tag{42}$$

All three forms of orbits (32), (37), and (42) exist in molecules consisting of atoms, which do not possess the same orbits. But their order depends on the masses [14,20] of both the fermions of leptonic families and the structural particles of atomic nuclei

$$m_p^E = 938.272 \text{ MeV}, \quad m_n^E = 939.565 \text{ MeV}, \tag{43}$$

$$m_p^W = 2.8049 \cdot 10^{-5} \text{ eV}, \quad m_n^W = 5.6021 \cdot 10^{-18} \text{ eV}. \tag{44}$$

Finally, we observe that the suggested atomic structure, which explains the orbit quantization around a nucleus with a flavor type dependence and the availability in nature of a quantized sequence of leptonic families that recognize the existence in our space-time of antiprotons, neutrons, leptons, and antineutrinos, does not exclude the idea that $l^-_{L,R}$, $\bar{\nu}_{lR,L}$, $p^+_{R,L}$, and $n^-_{L,R}$ are of fermions and that $l^+_{R,L}$, $\nu_{lL,R}$, $p^-_{L,R}$, and $n^+_{R,L}$ refer to antifermions.

3. Boson, lepton, and antineutrino orbits of an atom

The preceding reasoning says that nature itself constitutes atomic systems so that to the case of spinless nuclei without isospin corresponds a kind of orbital order. A beautiful example is the order of orbits of the following atoms:

$$He^4_2 \to O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon} \to N^o_{\epsilon\bar{\nu}_\epsilon} = 1, 2 \to N_{\epsilon\bar{\nu}_\epsilon} = 1, 1,$$

$$Li^6_3 \to O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O_{e\bar{\nu}_e} \to N^o_{\epsilon\bar{\nu}_\epsilon} = 1, 2, \quad N^o_{e\bar{\nu}_e} = 3 \to N_{\epsilon\bar{\nu}_\epsilon} = 1, 1, \quad N_{e\bar{\nu}_e} = 1,$$

$$B_5^{10} \to O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O_{\mu\bar{\nu}_\mu} \to N^o_{\epsilon\bar{\nu}_\epsilon} = 1,2,\quad N^o_{e\bar{\nu}_e} = 3,4,$$
$$N^o_{\mu\bar{\nu}_\mu} = 5 \to N_{\epsilon\bar{\nu}_\epsilon} = 1,1,\quad N_{e\bar{\nu}_e} = 1,1,\quad N_{\mu\bar{\nu}_\mu} = 1,$$

$$C_6^{12} \to O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu} \to N^o_{\epsilon\bar{\nu}_\epsilon} = 1,2,\quad N^o_{e\bar{\nu}_e} = 3,4,$$
$$N^o_{\mu\bar{\nu}_\mu} = 5,6 \to N_{\epsilon\bar{\nu}_\epsilon} = 1,1,\quad N_{e\bar{\nu}_e} = 1,1,\quad N_{\mu\bar{\nu}_\mu} = 1,1,$$

$$N_7^{14} \to O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\epsilon\bar{\nu}_\epsilon} = 1,2,\quad N^o_{e\bar{\nu}_e} = 3,4,$$
$$N^o_{\mu\bar{\nu}_\mu} = 5,6,\quad N^o_{\tau\bar{\nu}_\tau} = 7 \to N_{\epsilon\bar{\nu}_\epsilon} = 1,1,\quad N_{e\bar{\nu}_e} = 1,1,\quad N_{\mu\bar{\nu}_\mu} = 1,1,\quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$O_8^{16} \to O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\epsilon\bar{\nu}_\epsilon} = 1,2,$$
$$N^o_{e\bar{\nu}_e} = 3,4,\quad N^o_{\mu\bar{\nu}_\mu} = 5,6,\quad N^o_{\tau\bar{\nu}_\tau} = 7,8 \to N_{\epsilon\bar{\nu}_\epsilon} = 1,1,\quad N_{e\bar{\nu}_e} = 1,1,$$
$$N_{\mu\bar{\nu}_\mu} = 1,1,\quad N_{\tau\bar{\nu}_\tau} = 1,1,$$

$$F_9^{18} \to O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\epsilon\bar{\nu}_\epsilon} = 1,2,\quad N^o_{e\bar{\nu}_e} = 3,4,$$
$$N^o_{\mu\bar{\nu}_\mu} = 5,6,\quad N^o_{\tau\bar{\nu}_\tau} = 7 \to N_{\epsilon\bar{\nu}_\epsilon} = 2,2,\quad N_{e\bar{\nu}_e} = 1,1,\quad N_{\mu\bar{\nu}_\mu} = 1,1,\quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Ne_{10}^{20} \to O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\epsilon\bar{\nu}_\epsilon} = 1,2,$$
$$N^o_{e\bar{\nu}_e} = 3,4,\quad N^o_{\mu\bar{\nu}_\mu} = 5,6,\quad N^o_{\tau\bar{\nu}_\tau} = 7,8 \to N_{\epsilon\bar{\nu}_\epsilon} = 2,2,\quad N_{e\bar{\nu}_e} = 1,1,$$
$$N_{\mu\bar{\nu}_\mu} = 1,1,\quad N_{\tau\bar{\nu}_\tau} = 1,1,$$

$$Na_{11}^{22} \to O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\epsilon\bar{\nu}_\epsilon} = 1,2,\quad N^o_{e\bar{\nu}_e} = 3,4,$$
$$N^o_{\mu\bar{\nu}_\mu} = 5,6,\quad N^o_{\tau\bar{\nu}_\tau} = 7 \to N_{\epsilon\bar{\nu}_\epsilon} = 2,2,\quad N_{e\bar{\nu}_e} = 2,2,\quad N_{\mu\bar{\nu}_\mu} = 1,1,\quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Mg_{12}^{24} \to O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\epsilon\bar{\nu}_\epsilon} = 1,2,$$
$$N^o_{e\bar{\nu}_e} = 3,4,\quad N^o_{\mu\bar{\nu}_\mu} = 5,6,\quad N^o_{\tau\bar{\nu}_\tau} = 7,8 \to N_{\epsilon\bar{\nu}_\epsilon} = 2,2,\quad N_{e\bar{\nu}_e} = 2,2,$$
$$N_{\mu\bar{\nu}_\mu} = 1,1,\quad N_{\tau\bar{\nu}_\tau} = 1,1,$$

$$Al_{13}^{26} \to O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\epsilon\bar{\nu}_\epsilon} = 1,2,\quad N^o_{e\bar{\nu}_e} = 3,4,$$
$$N^o_{\mu\bar{\nu}_\mu} = 5,6,\quad N^o_{\tau\bar{\nu}_\tau} = 7 \to N_{\epsilon\bar{\nu}_\epsilon} = 2,2,\quad N_{e\bar{\nu}_e} = 2,2,\quad N_{\mu\bar{\nu}_\mu} = 2,2,\quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Si_{14}^{28} \to O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\epsilon\bar{\nu}_\epsilon} = 1,2,$$
$$N^o_{e\bar{\nu}_e} = 3,4,\quad N^o_{\mu\bar{\nu}_\mu} = 5,6,\quad N^o_{\tau\bar{\nu}_\tau} = 7,8 \to N_{\epsilon\bar{\nu}_\epsilon} = 2,2,\quad N_{e\bar{\nu}_e} = 2,2,$$
$$N_{\mu\bar{\nu}_\mu} = 2,2,\quad N_{\tau\bar{\nu}_\tau} = 1,1,$$

$$P_{15}^{30} \to O_{\epsilon\bar{\nu}_\epsilon}^L, \quad O_{\epsilon\bar{\nu}_\epsilon}^R, \quad O_{e\bar{\nu}_e}^L, \quad O_{e\bar{\nu}_e}^R, \quad O_{\mu\bar{\nu}_\mu}^L, \quad O_{\mu\bar{\nu}_\mu}^R, \quad O_{\tau\bar{\nu}_\tau} \to N_{\epsilon\bar{\nu}_\epsilon}^o = 1,2, \quad N_{e\bar{\nu}_e}^o = 3,4,$$
$$N_{\mu\bar{\nu}_\mu}^o = 5,6, \quad N_{\tau\bar{\nu}_\tau}^o = 7 \to N_{\epsilon\bar{\nu}_\epsilon} = 3,3, \quad N_{e\bar{\nu}_e} = 2,2, \quad N_{\mu\bar{\nu}_\mu} = 2,2, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$S_{16}^{32} \to O_{\epsilon\bar{\nu}_\epsilon}^L, \quad O_{\epsilon\bar{\nu}_\epsilon}^R, \quad O_{e\bar{\nu}_e}^L, \quad O_{e\bar{\nu}_e}^R, \quad O_{\mu\bar{\nu}_\mu}^L, \quad O_{\mu\bar{\nu}_\mu}^R, \quad O_{\tau\bar{\nu}_\tau}^L, \quad O_{\tau\bar{\nu}_\tau}^R \to N_{\epsilon\bar{\nu}_\epsilon}^o = 1,2,$$
$$N_{e\bar{\nu}_e}^o = 3,4, \quad N_{\mu\bar{\nu}_\mu}^o = 5,6, \quad N_{\tau\bar{\nu}_\tau}^o = 7,8 \to N_{\epsilon\bar{\nu}_\epsilon} = 3,3, \quad N_{e\bar{\nu}_e} = 2,2,$$
$$N_{\mu\bar{\nu}_\mu} = 2,2, \quad N_{\tau\bar{\nu}_\tau} = 1,1,$$

$$Ca_{20}^{40} \to O_{\epsilon\bar{\nu}_\epsilon}^L, \quad O_{\epsilon\bar{\nu}_\epsilon}^R, \quad O_{e\bar{\nu}_e}^L, \quad O_{e\bar{\nu}_e}^R, \quad O_{\mu\bar{\nu}_\mu}^L, \quad O_{\mu\bar{\nu}_\mu}^R, \quad O_{\tau\bar{\nu}_\tau}^L, \quad O_{\tau\bar{\nu}_\tau}^R \to N_{\epsilon\bar{\nu}_\epsilon}^o = 1,2,$$
$$N_{e\bar{\nu}_e}^o = 3,4, \quad N_{\mu\bar{\nu}_\mu}^o = 5,6, \quad N_{\tau\bar{\nu}_\tau}^o = 7,8 \to N_{\epsilon\bar{\nu}_\epsilon} = 4,4, \quad N_{e\bar{\nu}_e} = 3,3,$$
$$N_{\mu\bar{\nu}_\mu} = 2,2, \quad N_{\tau\bar{\nu}_\tau} = 1,1.$$

The size of $N_{l\bar{\nu}_l}^o$ here describes the order of boson orbits, whereas $N_{l\bar{\nu}_l}$ characterizes the quantity of leptonic bosons in each of them.

Furthermore, if $N_{l\bar{\nu}_l} = 1$ at $N_{l\bar{\nu}_l}^o = 3,5,7$, then the spin state of the internal parts of a single leptonic boson in any of these final boson orbits $O_{l\bar{\nu}_l}$ depends on whether the nucleons of the latter hadronic string in atomic nucleus refer to left- or right-handed fermions.

Another characteristic moment is an equal number of particles of the left- and right-handed atomic orbits of the same leptonic family. Such a correspondence expresses the dynamical origination of the spontaneous mirror symmetry violation in an atom as well as the unidenticality [21] of masses, energies, and momenta of its left- and right-handed objects.

But for atoms, in a nucleus of which $Z > N$, boson orbits are not the only orbits. They have additional lepton orbits. An example of this may be each unstable isotope of

$$He_2^3 \to O_\epsilon, \quad O_{\epsilon\bar{\nu}_\epsilon} \to N_\epsilon^o = 1, \quad N_{\epsilon\bar{\nu}_\epsilon}^o = 2 \to N_\epsilon = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,$$

$$C_6^9 \to O_\epsilon^L, \quad O_\epsilon^R, \quad O_e, \quad O_{\epsilon\bar{\nu}_\epsilon}^L, \quad O_{\epsilon\bar{\nu}_\epsilon}^R, \quad O_{e\bar{\nu}_e} \to N_\epsilon^o = 1,2, \quad N_e^o = 3,$$
$$N_{\epsilon\bar{\nu}_\epsilon}^o = 4,5, \quad N_{e\bar{\nu}_e}^o = 6 \to N_\epsilon = 1,1, \quad N_e = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,1, \quad N_{e\bar{\nu}_e} = 1,$$

$$F_9^{17} \to O_\epsilon, \quad O_{\epsilon\bar{\nu}_\epsilon}^L, \quad O_{\epsilon\bar{\nu}_\epsilon}^R, \quad O_{e\bar{\nu}_e}^L, \quad O_{e\bar{\nu}_e}^R, \quad O_{\mu\bar{\nu}_\mu}^L, \quad O_{\mu\bar{\nu}_\mu}^R, \quad O_{\tau\bar{\nu}_\tau}^L, \quad O_{\tau\bar{\nu}_\tau}^R \to N_\epsilon^o = 1,$$
$$N_{\epsilon\bar{\nu}_\epsilon}^o = 2,3, \quad N_{e\bar{\nu}_e}^o = 4,5, \quad N_{\mu\bar{\nu}_\mu}^o = 6,7, \quad N_{\tau\bar{\nu}_\tau}^o = 8,9 \to N_\epsilon = 1,$$
$$N_{\epsilon\bar{\nu}_\epsilon} = 1,1, \quad N_{e\bar{\nu}_e} = 1,1, \quad N_{\mu\bar{\nu}_\mu} = 1,1, \quad N_{\tau\bar{\nu}_\tau} = 1,1,$$

$$Ne_{10}^{17} \to O_\epsilon^L, \quad O_\epsilon^R, \quad O_e, \quad O_{\epsilon\bar{\nu}_\epsilon}^L, \quad O_{\epsilon\bar{\nu}_\epsilon}^R, \quad O_{e\bar{\nu}_e}^L, \quad O_{e\bar{\nu}_e}^R, \quad O_{\mu\bar{\nu}_\mu}^L, \quad O_{\mu\bar{\nu}_\mu}^R, \quad O_{\tau\bar{\nu}_\tau} \to N_\epsilon^o = 1,2,$$
$$N_e^o = 3, \quad N_{\epsilon\bar{\nu}_\epsilon}^o = 4,5, \quad N_{e\bar{\nu}_e}^o = 6,7, \quad N_{\mu\bar{\nu}_\mu}^o = 8,9, \quad N_{\tau\bar{\nu}_\tau}^o = 10 \to N_\epsilon = 1,1,$$
$$N_e = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,1, \quad N_{e\bar{\nu}_e} = 1,1, \quad N_{\mu\bar{\nu}_\mu} = 1,1, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

where N_l^o implies the order of lepton orbits, and N_l denotes the quantity of their leptons.

An atom thus chooses the spin state of a single particle of his lepton orbit O_l so that to the left- or right-handed lepton corresponds in its nucleus a kind of polarized antiproton.

There are many other atoms in which antineutrino orbits appear, since the numbers of antiprotons and neutrons in their nuclei satisfy the inequality $N > Z$ violating the conservation of the summed baryon and lepton number in atomic systems. For example, in atoms such as

$$Be_4^9 \to O_{\bar{\nu}_\epsilon}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e} \to N^o_{\bar{\nu}_\epsilon} = 1, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 2,3,$$
$$N^o_{e\bar{\nu}_e} = 4,5 \to N_{\bar{\nu}_\epsilon} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,1, \quad N_{e\bar{\nu}_e} = 1,1,$$

$$Cl_{17}^{35} \to O_{\bar{\nu}_\epsilon}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e}, \quad O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon} = 2,3, \quad N^o_{e\bar{\nu}_e} = 4,5, \quad N^o_{\mu\bar{\nu}_\mu} = 6,7, \quad N^o_{\tau\bar{\nu}_\tau} = 8 \to N_{\bar{\nu}_\epsilon} = 1,$$
$$N_{\epsilon\bar{\nu}_\epsilon} = 3,3, \quad N_{e\bar{\nu}_e} = 3,3, \quad N_{\mu\bar{\nu}_\mu} = 2,2, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Ar_{18}^{40} \to O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e}, \quad O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu},$$
$$O^L_{\tau\bar{\nu}_\tau}, \quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 5,6, \quad N^o_{e\bar{\nu}_e} = 7,8,$$
$$N^o_{\mu\bar{\nu}_\mu} = 9,10, \quad N^o_{\tau\bar{\nu}_\tau} = 11,12 \to N_{\bar{\nu}_\epsilon} = 1,1, \quad N_{\bar{\nu}_e} = 1,1,$$
$$N_{\epsilon\bar{\nu}_\epsilon} = 3,3, \quad N_{e\bar{\nu}_e} = 3,3, \quad N_{\mu\bar{\nu}_\mu} = 2,2, \quad N_{\tau\bar{\nu}_\tau} = 1,1,$$

$$K_{19}^{39} \to O_{\bar{\nu}_\epsilon}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e}, \quad O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon} = 2,3, \quad N^o_{e\bar{\nu}_e} = 4,5, \quad N^o_{\mu\bar{\nu}_\mu} = 6,7, \quad N^o_{\tau\bar{\nu}_\tau} = 8 \to N_{\bar{\nu}_\epsilon} = 1,$$
$$N_{\epsilon\bar{\nu}_\epsilon} = 3,3, \quad N_{e\bar{\nu}_e} = 3,3, \quad N_{\mu\bar{\nu}_\mu} = 3,3, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Sc_{21}^{45} \to O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O_{\bar{\nu}_e}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e}, \quad O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2,$$
$$N^o_{\bar{\nu}_e} = 3, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 4,5, \quad N^o_{e\bar{\nu}_e} = 6,7, \quad N^o_{\mu\bar{\nu}_\mu} = 8,9, \quad N^o_{\tau\bar{\nu}_\tau} = 10 \to N_{\bar{\nu}_\epsilon} = 1,1,$$
$$N_{\bar{\nu}_e} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 4,4, \quad N_{e\bar{\nu}_e} = 3,3, \quad N_{\mu\bar{\nu}_\mu} = 3,3, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Ti_{22}^{48} \to O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e}, \quad O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu},$$
$$O^L_{\tau\bar{\nu}_\tau}, \quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 5,6, \quad N^o_{e\bar{\nu}_e} = 7,8,$$
$$N^o_{\mu\bar{\nu}_\mu} = 9,10, \quad N^o_{\tau\bar{\nu}_\tau} = 11,12 \to N_{\bar{\nu}_\epsilon} = 1,1, \quad N_{\bar{\nu}_e} = 1,1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 4,4,$$
$$N_{e\bar{\nu}_e} = 3,3, \quad N_{\mu\bar{\nu}_\mu} = 2,2, \quad N_{\tau\bar{\nu}_\tau} = 2,2,$$

$$V_{23}^{51} \to O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O_{\bar{\nu}_\mu}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e}, \quad O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu},$$
$$O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4, \quad N^o_{\bar{\nu}_\mu} = 5, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 6,7, \quad N^o_{e\bar{\nu}_e} = 8,9,$$
$$N^o_{\mu\bar{\nu}_\mu} = 10,11, \quad N^o_{\tau\bar{\nu}_\tau} = 12 \to N_{\bar{\nu}_\epsilon} = 1,1, \quad N_{\bar{\nu}_e} = 1,1, \quad N_{\bar{\nu}_\mu} = 1,$$
$$N_{\epsilon\bar{\nu}_\epsilon} = 4,4, \quad N_{e\bar{\nu}_e} = 4,4, \quad N_{\mu\bar{\nu}_\mu} = 3,3, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Cr_{24}^{52} \to O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e}, \quad O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O^L_{\tau\bar{\nu}_\tau},$$
$$O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 5,6, \quad N^o_{e\bar{\nu}_e} = 7,8,$$

$$N^o_{\mu\bar{\nu}_\mu}=9,10,\quad N^o_{\tau\bar{\nu}_\tau}=11,12\rightarrow N_{\bar{\nu}_\epsilon}=1,1,\quad N_{\bar{\nu}_e}=1,1,\quad N_{\epsilon\bar{\nu}_\epsilon}=4,4,$$
$$N_{e\bar{\nu}_e}=3,3,\quad N_{\mu\bar{\nu}_\mu}=3,3,\quad N_{\tau\bar{\nu}_\tau}=2,2,$$

$$Mn^{55}_{25}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O_{\bar{\nu}_\mu},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},$$
$$O_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4,\quad N^o_{\bar{\nu}_\mu}=5,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=6,7,\quad N^o_{e\bar{\nu}_e}=8,9,$$
$$N^o_{\mu\bar{\nu}_\mu}=10,11,\quad N^o_{\tau\bar{\nu}_\tau}=12\rightarrow N_{\bar{\nu}_\epsilon}=1,1,\quad N_{\bar{\nu}_e}=1,1,\quad N_{\bar{\nu}_\mu}=1,$$
$$N_{\epsilon\bar{\nu}_\epsilon}=5,5,\quad N_{e\bar{\nu}_e}=4,4,\quad N_{\mu\bar{\nu}_\mu}=3,3,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Fe^{56}_{26}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},$$
$$O^R_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=5,6,\quad N^o_{e\bar{\nu}_e}=7,8,$$
$$N^o_{\mu\bar{\nu}_\mu}=9,10,\quad N^o_{\tau\bar{\nu}_\tau}=11,12\rightarrow N_{\bar{\nu}_\epsilon}=1,1,\quad N_{\bar{\nu}_e}=1,1,$$
$$N_{\epsilon\bar{\nu}_\epsilon}=4,4,\quad N_{e\bar{\nu}_e}=4,4,\quad N_{\mu\bar{\nu}_\mu}=3,3,\quad N_{\tau\bar{\nu}_\tau}=2,2,$$

$$Co^{59}_{27}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O_{\bar{\nu}_\mu},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},$$
$$O_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4,\quad N^o_{\bar{\nu}_\mu}=5,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=6,7,\quad N^o_{e\bar{\nu}_e}=8,9,$$
$$N^o_{\mu\bar{\nu}_\mu}=10,11,\quad N^o_{\tau\bar{\nu}_\tau}=12\rightarrow N_{\bar{\nu}_\epsilon}=1,1,\quad N_{\bar{\nu}_e}=1,1,\quad N_{\bar{\nu}_\mu}=1,$$
$$N_{\epsilon\bar{\nu}_\epsilon}=5,5,\quad N_{e\bar{\nu}_e}=4,4,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Ni^{58}_{28}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},$$
$$O^R_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=3,4,\quad N^o_{e\bar{\nu}_e}=5,6,\quad N^o_{\mu\bar{\nu}_\mu}=7,8,$$
$$N^o_{\tau\bar{\nu}_\tau}=9,10\rightarrow N_{\bar{\nu}_\epsilon}=1,1,\quad N_{\epsilon\bar{\nu}_\epsilon}=5,5,\quad N_{e\bar{\nu}_e}=4,4,\quad N_{\mu\bar{\nu}_\mu}=3,3,\quad N_{\tau\bar{\nu}_\tau}=2,2,$$

$$Cu^{63}_{29}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O_{\bar{\nu}_\mu},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},$$
$$O_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4,\quad N^o_{\bar{\nu}_\mu}=5,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=6,7,\quad N^o_{e\bar{\nu}_e}=8,9,$$
$$N^o_{\mu\bar{\nu}_\mu}=10,11,\quad N^o_{\tau\bar{\nu}_\tau}=12\rightarrow N_{\bar{\nu}_\epsilon}=1,1,\quad N_{\bar{\nu}_e}=1,1,\quad N_{\bar{\nu}_\mu}=1,$$
$$N_{\epsilon\bar{\nu}_\epsilon}=5,5,\quad N_{e\bar{\nu}_e}=5,5,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Zn^{65}_{30}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O_{\bar{\nu}_\mu},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},$$
$$O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4,\quad N^o_{\bar{\nu}_\mu}=5,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=6,7,\quad N^o_{e\bar{\nu}_e}=8,9,$$
$$N^o_{\mu\bar{\nu}_\mu}=10,11,\quad N^o_{\tau\bar{\nu}_\tau}=12,13\rightarrow N_{\bar{\nu}_\epsilon}=1,1,\quad N_{\bar{\nu}_e}=1,1,\quad N_{\bar{\nu}_\mu}=1,$$
$$N_{\epsilon\bar{\nu}_\epsilon}=5,5,\quad N_{e\bar{\nu}_e}=4,4,\quad N_{\mu\bar{\nu}_\mu}=3,3,\quad N_{\tau\bar{\nu}_\tau}=3,3,$$

$$Ga^{69}_{31}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},$$
$$O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4,\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14\rightarrow N_{\bar{\nu}_\epsilon}=1,1,\quad N_{\bar{\nu}_e}=1,1,\quad N_{\bar{\nu}_\mu}=1,1,$$

$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=6,6,\quad N_{e\bar{\nu}_e}=5,5,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Ge^{72}_{32}\to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O^L_{\bar{\nu}_\tau},\ \ O^R_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\ \ O^R_{\mu\bar{\nu}_\mu},\ \ O^L_{\tau\bar{\nu}_\tau},\ \ O^R_{\tau\bar{\nu}_\tau}\to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4,\quad N^o_{\bar{\nu}_\mu}=5,6\quad N^o_{\bar{\nu}_\tau}=7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,\quad N^o_{e\bar{\nu}_e}=11,12,\quad N^o_{\mu\bar{\nu}_\mu}=13,14,\quad N^o_{\tau\bar{\nu}_\tau}=15,16\to N_{\bar{\nu}_\epsilon}=1,1,\quad N_{\bar{\nu}_e}=1,1,$$
$$N_{\bar{\nu}_\mu}=1,1,\quad N_{\bar{\nu}_\tau}=1,1,\quad N_{\epsilon\bar{\nu}_\epsilon}=5,5,\quad N_{e\bar{\nu}_e}=4,4,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=3,3,$$

$$As^{75}_{33}\to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},\ \ O^L_{\mu\bar{\nu}_\mu},$$

$$O^R_{\mu\bar{\nu}_\mu},\ \ O_{\tau\bar{\nu}_\tau}\to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14\to N_{\bar{\nu}_\epsilon}=2,2,\quad N_{\bar{\nu}_e}=1,1,\quad N_{\bar{\nu}_\mu}=1,1,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=6,6,\quad N_{e\bar{\nu}_e}=6,6,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Se^{79}_{34}\to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},\ \ O^L_{\mu\bar{\nu}_\mu},$$

$$O^R_{\mu\bar{\nu}_\mu},\ \ O^L_{\tau\bar{\nu}_\tau},\ \ O^R_{\tau\bar{\nu}_\tau}\to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14,15\to N_{\bar{\nu}_\epsilon}=2,2,\quad N_{\bar{\nu}_e}=2,2,\quad N_{\bar{\nu}_\mu}=1,1,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=5,5,\quad N_{e\bar{\nu}_e}=5,5,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=3,3,$$

$$Br^{80}_{35}\to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},\ \ O^L_{\mu\bar{\nu}_\mu},$$

$$O^R_{\mu\bar{\nu}_\mu},\ \ O_{\tau\bar{\nu}_\tau}\to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=7,8,\quad N^o_{e\bar{\nu}_e}=9,10,$$
$$N^o_{\mu\bar{\nu}_\mu}=11,12,\quad N^o_{\tau\bar{\nu}_\tau}=13\to N_{\bar{\nu}_\epsilon}=2,2,\quad N_{\bar{\nu}_e}=2,2,\quad N_{\bar{\nu}_\mu}=1,1,$$
$$N_{\epsilon\bar{\nu}_\epsilon}=7,7,\quad N_{e\bar{\nu}_e}=6,6,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Kr^{84}_{36}\to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O^L_{\bar{\nu}_\tau},\ \ O^R_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\ \ O^R_{\mu\bar{\nu}_\mu},\ \ O^L_{\tau\bar{\nu}_\tau},\ \ O^R_{\tau\bar{\nu}_\tau}\to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,\quad N^o_{e\bar{\nu}_e}=11,12,\quad N^o_{\mu\bar{\nu}_\mu}=13,14,\quad N^o_{\tau\bar{\nu}_\tau}=15,16\to N_{\bar{\nu}_\epsilon}=2,2,\quad N_{\bar{\nu}_e}=2,2,$$
$$N_{\bar{\nu}_\mu}=1,1,\quad N_{\bar{\nu}_\tau}=1,1,\quad N_{\epsilon\bar{\nu}_\epsilon}=6,6,\quad N_{e\bar{\nu}_e}=5,5,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=3,3,$$

$$Rb^{85}_{37}\to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},\ \ O^L_{\mu\bar{\nu}_\mu},$$

$$O^R_{\mu\bar{\nu}_\mu},\ \ O_{\tau\bar{\nu}_\tau}\to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14\to N_{\bar{\nu}_\epsilon}=2,2,\quad N_{\bar{\nu}_e}=2,2,\quad N_{\bar{\nu}_\mu}=1,1,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=7,7,\quad N_{e\bar{\nu}_e}=7,7,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Sr^{87}_{38}\to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},\ \ O^L_{\mu\bar{\nu}_\mu},$$

$$O^R_{\mu\bar{\nu}_\mu},\ \ O^L_{\tau\bar{\nu}_\tau},\ \ O^R_{\tau\bar{\nu}_\tau}\to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$

$$N^o_{e\bar\nu_e} = 10, 11, \quad N^o_{\mu\bar\nu_\mu} = 12, 13, \quad N^o_{\tau\bar\nu_\tau} = 14, 15 \to N_{\bar\nu_\epsilon} = 2, 2, \quad N_{\bar\nu_e} = 2, 2, \quad N_{\bar\nu_\mu} = 1, 1,$$
$$N_{\bar\nu_\tau} = 1, \quad N_{\epsilon\bar\nu_\epsilon} = 6, 6, \quad N_{e\bar\nu_e} = 5, 5, \quad N_{\mu\bar\nu_\mu} = 4, 4, \quad N_{\tau\bar\nu_\tau} = 4, 4,$$

$$Y^{89}_{39} \to O^L_{\bar\nu_\epsilon}, \quad O^R_{\bar\nu_\epsilon}, \quad O^L_{\bar\nu_e}, \quad O^R_{\bar\nu_e}, \quad O^L_{\bar\nu_\mu}, \quad O^R_{\bar\nu_\mu}, \quad O_{\bar\nu_\tau}, \quad O^L_{\epsilon\bar\nu_\epsilon}, \quad O^R_{\epsilon\bar\nu_\epsilon}, \quad O^L_{e\bar\nu_e}, \quad O^R_{e\bar\nu_e}, \quad O^L_{\mu\bar\nu_\mu},$$
$$O^R_{\mu\bar\nu_\mu}, \quad O_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1, 2, \quad N^o_{\bar\nu_e} = 3, 4 \quad N^o_{\bar\nu_\mu} = 5, 6, \quad N^o_{\bar\nu_\tau} = 7, \quad N^o_{\epsilon\bar\nu_\epsilon} = 8, 9,$$
$$N^o_{e\bar\nu_e} = 10, 11, \quad N^o_{\mu\bar\nu_\mu} = 12, 13, \quad N^o_{\tau\bar\nu_\tau} = 14 \to N_{\bar\nu_\epsilon} = 2, 2, \quad N_{\bar\nu_e} = 2, 2, \quad N_{\bar\nu_\mu} = 1, 1,$$
$$N_{\bar\nu_\tau} = 1, \quad N_{\epsilon\bar\nu_\epsilon} = 8, 8, \quad N_{e\bar\nu_e} = 7, 7, \quad N_{\mu\bar\nu_\mu} = 4, 4, \quad N_{\tau\bar\nu_\tau} = 1,$$

$$Zr^{91}_{40} \to O^L_{\bar\nu_\epsilon}, \quad O^R_{\bar\nu_\epsilon}, \quad O^L_{\bar\nu_e}, \quad O^R_{\bar\nu_e}, \quad O^L_{\bar\nu_\mu}, \quad O^R_{\bar\nu_\mu}, \quad O_{\bar\nu_\tau}, \quad O^L_{\epsilon\bar\nu_\epsilon}, \quad O^R_{\epsilon\bar\nu_\epsilon}, \quad O^L_{e\bar\nu_e}, \quad O^R_{e\bar\nu_e}, \quad O^L_{\mu\bar\nu_\mu},$$
$$O^R_{\mu\bar\nu_\mu}, \quad O^L_{\tau\bar\nu_\tau}, \quad O^R_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1, 2, \quad N^o_{\bar\nu_e} = 3, 4 \quad N^o_{\bar\nu_\mu} = 5, 6, \quad N^o_{\bar\nu_\tau} = 7, \quad N^o_{\epsilon\bar\nu_\epsilon} = 8, 9,$$
$$N^o_{e\bar\nu_e} = 10, 11, \quad N^o_{\mu\bar\nu_\mu} = 12, 13, \quad N^o_{\tau\bar\nu_\tau} = 14, 15 \to N_{\bar\nu_\epsilon} = 2, 2, \quad N_{\bar\nu_e} = 2, 2, \quad N_{\bar\nu_\mu} = 1, 1,$$
$$N_{\bar\nu_\tau} = 1, \quad N_{\epsilon\bar\nu_\epsilon} = 6, 6, \quad N_{e\bar\nu_e} = 5, 5, \quad N_{\mu\bar\nu_\mu} = 5, 5, \quad N_{\tau\bar\nu_\tau} = 4, 4,$$

$$Nb^{93}_{41} \to O^L_{\bar\nu_\epsilon}, \quad O^R_{\bar\nu_\epsilon}, \quad O^L_{\bar\nu_e}, \quad O^R_{\bar\nu_e}, \quad O^L_{\bar\nu_\mu}, \quad O^R_{\bar\nu_\mu}, \quad O_{\bar\nu_\tau}, \quad O^L_{\epsilon\bar\nu_\epsilon}, \quad O^R_{\epsilon\bar\nu_\epsilon}, \quad O^L_{e\bar\nu_e}, \quad O^R_{e\bar\nu_e}, \quad O^L_{\mu\bar\nu_\mu},$$
$$O^R_{\mu\bar\nu_\mu}, \quad O_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1, 2, \quad N^o_{\bar\nu_e} = 3, 4 \quad N^o_{\bar\nu_\mu} = 5, 6, \quad N^o_{\bar\nu_\tau} = 7, \quad N^o_{\epsilon\bar\nu_\epsilon} = 8, 9,$$
$$N^o_{e\bar\nu_e} = 10, 11, \quad N^o_{\mu\bar\nu_\mu} = 12, 13, \quad N^o_{\tau\bar\nu_\tau} = 14 \to N_{\bar\nu_\epsilon} = 2, 2, \quad N_{\bar\nu_e} = 2, 2, \quad N_{\bar\nu_\mu} = 1, 1,$$
$$N_{\bar\nu_\tau} = 1, \quad N_{\epsilon\bar\nu_\epsilon} = 8, 8, \quad N_{e\bar\nu_e} = 8, 8, \quad N_{\mu\bar\nu_\mu} = 4, 4, \quad N_{\tau\bar\nu_\tau} = 1,$$

$$Mo^{96}_{42} \to O^L_{\bar\nu_\epsilon}, \quad O^R_{\bar\nu_\epsilon}, \quad O^L_{\bar\nu_e}, \quad O^R_{\bar\nu_e}, \quad O^L_{\bar\nu_\mu}, \quad O^R_{\bar\nu_\mu}, \quad O^L_{\bar\nu_\tau}, \quad O^R_{\bar\nu_\tau}, \quad O^L_{\epsilon\bar\nu_\epsilon}, \quad O^R_{\epsilon\bar\nu_\epsilon}, \quad O^L_{e\bar\nu_e}, \quad O^R_{e\bar\nu_e},$$
$$O^L_{\mu\bar\nu_\mu}, \quad O^R_{\mu\bar\nu_\mu}, \quad O^L_{\tau\bar\nu_\tau}, \quad O^R_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1, 2, \quad N^o_{\bar\nu_e} = 3, 4 \quad N^o_{\bar\nu_\mu} = 5, 6, \quad N^o_{\bar\nu_\tau} = 7, 8,$$
$$N^o_{\epsilon\bar\nu_\epsilon} = 9, 10, \quad N^o_{e\bar\nu_e} = 11, 12, \quad N^o_{\mu\bar\nu_\mu} = 13, 14, \quad N^o_{\tau\bar\nu_\tau} = 15, 16 \to N_{\bar\nu_\epsilon} = 2, 2, \quad N_{\bar\nu_e} = 2, 2,$$
$$N_{\bar\nu_\mu} = 1, 1, \quad N_{\bar\nu_\tau} = 1, 1, \quad N_{\epsilon\bar\nu_\epsilon} = 6, 6, \quad N_{e\bar\nu_e} = 6, 6, \quad N_{\mu\bar\nu_\mu} = 5, 5, \quad N_{\tau\bar\nu_\tau} = 4, 4,$$

$$Tc^{97}_{43} \to O^L_{\bar\nu_\epsilon}, \quad O^R_{\bar\nu_\epsilon}, \quad O^L_{\bar\nu_e}, \quad O^R_{\bar\nu_e}, \quad O^L_{\bar\nu_\mu}, \quad O^R_{\bar\nu_\mu}, \quad O_{\bar\nu_\tau}, \quad O^L_{\epsilon\bar\nu_\epsilon}, \quad O^R_{\epsilon\bar\nu_\epsilon}, \quad O^L_{e\bar\nu_e}, \quad O^R_{e\bar\nu_e}, \quad O^L_{\mu\bar\nu_\mu},$$
$$O^R_{\mu\bar\nu_\mu}, \quad O_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1, 2, \quad N^o_{\bar\nu_e} = 3, 4 \quad N^o_{\bar\nu_\mu} = 5, 6, \quad N^o_{\bar\nu_\tau} = 7, \quad N^o_{\epsilon\bar\nu_\epsilon} = 8, 9,$$
$$N^o_{e\bar\nu_e} = 10, 11, \quad N^o_{\mu\bar\nu_\mu} = 12, 13, \quad N^o_{\tau\bar\nu_\tau} = 14 \to N_{\bar\nu_\epsilon} = 2, 2, \quad N_{\bar\nu_e} = 2, 2, \quad N_{\bar\nu_\mu} = 1, 1,$$
$$N_{\bar\nu_\tau} = 1, \quad N_{\epsilon\bar\nu_\epsilon} = 9, 9, \quad N_{e\bar\nu_e} = 8, 8, \quad N_{\mu\bar\nu_\mu} = 4, 4, \quad N_{\tau\bar\nu_\tau} = 1,$$

$$Ru^{102}_{44} \to O^L_{\bar\nu_\epsilon}, \quad O^R_{\bar\nu_\epsilon}, \quad O^L_{\bar\nu_e}, \quad O^R_{\bar\nu_e}, \quad O^L_{\bar\nu_\mu}, \quad O^R_{\bar\nu_\mu}, \quad O^L_{\bar\nu_\tau}, \quad O^R_{\bar\nu_\tau}, \quad O^L_{\epsilon\bar\nu_\epsilon}, \quad O^R_{\epsilon\bar\nu_\epsilon}, \quad O^L_{e\bar\nu_e}, \quad O^R_{e\bar\nu_e},$$
$$O^L_{\mu\bar\nu_\mu}, \quad O^R_{\mu\bar\nu_\mu}, \quad O^L_{\tau\bar\nu_\tau}, \quad O^R_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1, 2, \quad N^o_{\bar\nu_e} = 3, 4 \quad N^o_{\bar\nu_\mu} = 5, 6, \quad N^o_{\bar\nu_\tau} = 7, 8,$$
$$N^o_{\epsilon\bar\nu_\epsilon} = 9, 10, \quad N^o_{e\bar\nu_e} = 11, 12, \quad N^o_{\mu\bar\nu_\mu} = 13, 14, \quad N^o_{\tau\bar\nu_\tau} = 15, 16 \to N_{\bar\nu_\epsilon} = 2, 2, \quad N_{\bar\nu_e} = 2, 2,$$
$$N_{\bar\nu_\mu} = 2, 2, \quad N_{\bar\nu_\tau} = 1, 1, \quad N_{\epsilon\bar\nu_\epsilon} = 7, 7, \quad N_{e\bar\nu_e} = 6, 6, \quad N_{\mu\bar\nu_\mu} = 5, 5, \quad N_{\tau\bar\nu_\tau} = 4, 4,$$

$$Rh^{103}_{45} \to O^L_{\bar\nu_\epsilon}, \quad O^R_{\bar\nu_\epsilon}, \quad O^L_{\bar\nu_e}, \quad O^R_{\bar\nu_e}, \quad O^L_{\bar\nu_\mu}, \quad O^R_{\bar\nu_\mu}, \quad O_{\bar\nu_\tau}, \quad O^L_{\epsilon\bar\nu_\epsilon}, \quad O^R_{\epsilon\bar\nu_\epsilon}, \quad O^L_{e\bar\nu_e}, \quad O^R_{e\bar\nu_e}, \quad O^L_{\mu\bar\nu_\mu},$$

$$O^R_{\mu\bar{\nu}_\mu}, \quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 8,9,$$
$$N^o_{e\bar{\nu}_e} = 10,11, \quad N^o_{\mu\bar{\nu}_\mu} = 12,13, \quad N^o_{\tau\bar{\nu}_\tau} = 14 \to N_{\bar{\nu}_\epsilon} = 2,2, \quad N_{\bar{\nu}_e} = 2,2, \quad N_{\bar{\nu}_\mu} = 2,2,$$
$$N_{\bar{\nu}_\tau} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 9,9, \quad N_{e\bar{\nu}_e} = 9,9, \quad N_{\mu\bar{\nu}_\mu} = 4,4, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Pd^{106}_{46} \to O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O^L_{\bar{\nu}_\tau}, \quad O^R_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O^L_{\tau\bar{\nu}_\tau}, \quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon} = 9,10, \quad N^o_{e\bar{\nu}_e} = 11,12, \quad N^o_{\mu\bar{\nu}_\mu} = 13,14, \quad N^o_{\tau\bar{\nu}_\tau} = 15,16 \to N_{\bar{\nu}_\epsilon} = 2,2, \quad N_{\bar{\nu}_e} = 2,2,$$
$$N_{\bar{\nu}_\mu} = 2,2, \quad N_{\bar{\nu}_\tau} = 1,1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 7,7, \quad N_{e\bar{\nu}_e} = 6,6, \quad N_{\mu\bar{\nu}_\mu} = 5,5, \quad N_{\tau\bar{\nu}_\tau} = 5,5,$$

$$Ag^{108}_{47} \to O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O^L_{\bar{\nu}_\tau}, \quad O^R_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7,8, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 9,10,$$
$$N^o_{e\bar{\nu}_e} = 11,12, \quad N^o_{\mu\bar{\nu}_\mu} = 13,14, \quad N^o_{\tau\bar{\nu}_\tau} = 15 \to N_{\bar{\nu}_\epsilon} = 2,2, \quad N_{\bar{\nu}_e} = 2,2, \quad N_{\bar{\nu}_\mu} = 2,2,$$
$$N_{\bar{\nu}_\tau} = 1,1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 10,10, \quad N_{e\bar{\nu}_e} = 9,9, \quad N_{\mu\bar{\nu}_\mu} = 4,4, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Cd^{112}_{48} \to O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O^L_{\bar{\nu}_\tau}, \quad O^R_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O^L_{\tau\bar{\nu}_\tau}, \quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon} = 9,10, \quad N^o_{e\bar{\nu}_e} = 11,12, \quad N^o_{\mu\bar{\nu}_\mu} = 13,14, \quad N^o_{\tau\bar{\nu}_\tau} = 15,16 \to N_{\bar{\nu}_\epsilon} = 3,3, \quad N_{\bar{\nu}_e} = 2,2,$$
$$N_{\bar{\nu}_\mu} = 2,2, N_{\bar{\nu}_\tau} = 1,1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 7,7, \quad N_{e\bar{\nu}_e} = 6,6, \quad N_{\mu\bar{\nu}_\mu} = 6,6, \quad N_{\tau\bar{\nu}_\tau} = 5,5,$$

$$In^{115}_{49} \to O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 8,9,$$
$$N^o_{e\bar{\nu}_e} = 10,11, \quad N^o_{\mu\bar{\nu}_\mu} = 12,13, \quad N^o_{\tau\bar{\nu}_\tau} = 14 \to N_{\bar{\nu}_\epsilon} = 3,3, \quad N_{\bar{\nu}_e} = 3,3, \quad N_{\bar{\nu}_\mu} = 2,2,$$
$$N_{\bar{\nu}_\tau} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 10,10, \quad N_{e\bar{\nu}_e} = 10,10, \quad N_{\mu\bar{\nu}_\mu} = 4,4, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Sn^{118}_{50} \to O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O^L_{\bar{\nu}_\tau}, \quad O^R_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O^L_{\tau\bar{\nu}_\tau}, \quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon} = 9,10, \quad N^o_{e\bar{\nu}_e} = 11,12, \quad N^o_{\mu\bar{\nu}_\mu} = 13,14, \quad N^o_{\tau\bar{\nu}_\tau} = 15,16 \to N_{\bar{\nu}_\epsilon} = 3,3, \quad N_{\bar{\nu}_e} = 2,2,$$
$$N_{\bar{\nu}_\mu} = 2,2, \quad N_{\bar{\nu}_\tau} = 2,2, \quad N_{\epsilon\bar{\nu}_\epsilon} = 7,7, \quad N_{e\bar{\nu}_e} = 7,7, \quad N_{\mu\bar{\nu}_\mu} = 6,6, \quad N_{\tau\bar{\nu}_\tau} = 5,5,$$

$$Sb^{121}_{51} \to O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 8,9,$$
$$N^o_{e\bar{\nu}_e} = 10,11, \quad N^o_{\mu\bar{\nu}_\mu} = 12,13, \quad N^o_{\tau\bar{\nu}_\tau} = 14 \to N_{\bar{\nu}_\epsilon} = 3,3, \quad N_{\bar{\nu}_e} = 3,3, \quad N_{\bar{\nu}_\mu} = 3,3,$$
$$N_{\bar{\nu}_\tau} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 11,11, \quad N_{e\bar{\nu}_e} = 10,10, \quad N_{\mu\bar{\nu}_\mu} = 4,4, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Te^{127}_{52} \to O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e}, \quad O^L_{\mu\bar{\nu}_\mu},$$

$$O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14,15 \to N_{\bar{\nu}_\epsilon}=4,4,\quad N_{\bar{\nu}_e}=4,4,\quad N_{\bar{\nu}_\mu}=3,3,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=8,8,\quad N_{e\bar{\nu}_e}=7,7,\quad N_{\mu\bar{\nu}_\mu}=6,6,\quad N_{\tau\bar{\nu}_\tau}=5,5,$$

$$I^{127}_{53} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14 \to N_{\bar{\nu}_\epsilon}=4,4,\quad N_{\bar{\nu}_e}=4,4,\quad N_{\bar{\nu}_\mu}=2,2,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=11,11,\quad N_{e\bar{\nu}_e}=11,11,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Xe^{131}_{54} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},$$
$$O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14,15 \to N_{\bar{\nu}_\epsilon}=4,4,\quad N_{\bar{\nu}_e}=4,4,\quad N_{\bar{\nu}_\mu}=3,3,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=8,8,\quad N_{e\bar{\nu}_e}=7,7,\quad N_{\mu\bar{\nu}_\mu}=6,6,\quad N_{\tau\bar{\nu}_\tau}=6,6,$$

$$Cs^{133}_{55} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14 \to N_{\bar{\nu}_\epsilon}=4,4,\quad N_{\bar{\nu}_e}=4,4,\quad N_{\bar{\nu}_\mu}=3,3,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=12,12,\quad N_{e\bar{\nu}_e}=11,11,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Ba^{137}_{56} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},\quad O^L_{\mu\bar{\nu}_\mu},$$
$$O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14,15 \to N_{\bar{\nu}_\epsilon}=4,4,\quad N_{\bar{\nu}_e}=4,4,\quad N_{\bar{\nu}_\mu}=4,4,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=8,8,\quad N_{e\bar{\nu}_e}=7,7,\quad N_{\mu\bar{\nu}_\mu}=7,7,\quad N_{\tau\bar{\nu}_\tau}=6,6,$$

$$La^{139}_{57} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14 \to N_{\bar{\nu}_\epsilon}=4,4,\quad N_{\bar{\nu}_e}=4,4,\quad N_{\bar{\nu}_\mu}=4,4,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=12,12,\quad N_{e\bar{\nu}_e}=12,12,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1.$$

The numerical values of $N^o_{\bar{\nu}_l}$ characterize the order of antineutrino orbits, and $N_{\bar{\nu}_l}$ describes the quantity of antineutrinos in any of them.

A nucleus thus indicates that the helicity of a single antiparticle of the final antineutrino orbit $O_{\bar{\nu}_l}$ depends on the spin state of its latter neutron.

To express their idea more clearly, one must define an orbital structure of those atoms in which mass $(A = N + Z)$ number has been restricted from below by 140 and from above by 175 nucleons with an unequal number of antiprotons and neutrons. Such atomic systems can establish the order of antineutrino orbits in the following manner:

$$Ce^{140}_{58} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O^L_{\bar{\nu}_\tau},\quad O^R_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,\quad N^o_{e\bar{\nu}_e}=11,12,\quad N^o_{\mu\bar{\nu}_\mu}=13,14,\quad N^o_{\tau\bar{\nu}_\tau}=15,16 \to N_{\bar{\nu}_\epsilon}=4,4,\quad N_{\bar{\nu}_e}=3,3,$$
$$N_{\bar{\nu}_\mu}=3,3,\quad N_{\bar{\nu}_\tau}=2,2,\quad N_{\epsilon\bar{\nu}_\epsilon}=8,8,\quad N_{e\bar{\nu}_e}=8,8,\quad N_{\mu\bar{\nu}_\mu}=7,7,\quad N_{\tau\bar{\nu}_\tau}=6,6,$$

$$Pr^{141}_{59} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14 \to N_{\bar{\nu}_\epsilon}=4,4,\quad N_{\bar{\nu}_e}=4,4,\quad N_{\bar{\nu}_\mu}=3,3,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=13,13,\quad N_{e\bar{\nu}_e}=12,12,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Nd^{144}_{60} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O^L_{\bar{\nu}_\tau},\quad O^R_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,\quad N^o_{e\bar{\nu}_e}=11,12,\quad N^o_{\mu\bar{\nu}_\mu}=13,14,\quad N^o_{\tau\bar{\nu}_\tau}=15,16 \to N_{\bar{\nu}_\epsilon}=4,4,\quad N_{\bar{\nu}_e}=3,3,$$
$$N_{\bar{\nu}_\mu}=3,3,\quad N_{\bar{\nu}_\tau}=2,2,\quad N_{\epsilon\bar{\nu}_\epsilon}=9,9,\quad N_{e\bar{\nu}_e}=8,8,\quad N_{\mu\bar{\nu}_\mu}=7,7,\quad N_{\tau\bar{\nu}_\tau}=6,6,$$

$$Pm^{145}_{61} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14 \to N_{\bar{\nu}_\epsilon}=4,4,\quad N_{\bar{\nu}_e}=4,4,\quad N_{\bar{\nu}_\mu}=3,3,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=13,13,\quad N_{e\bar{\nu}_e}=13,13,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Sm^{150}_{62} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O^L_{\bar{\nu}_\tau},\quad O^R_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,\quad N^o_{e\bar{\nu}_e}=11,12,\quad N^o_{\mu\bar{\nu}_\mu}=13,14,\quad N^o_{\tau\bar{\nu}_\tau}=15,16 \to N_{\bar{\nu}_\epsilon}=4,4,\quad N_{\bar{\nu}_e}=3,3,$$
$$N_{\bar{\nu}_\mu}=3,3,\quad N_{\bar{\nu}_\tau}=3,3,\quad N_{\epsilon\bar{\nu}_\epsilon}=9,9,\quad N_{e\bar{\nu}_e}=8,8,\quad N_{\mu\bar{\nu}_\mu}=7,7,\quad N_{\tau\bar{\nu}_\tau}=7,7,$$

$$Eu^{152}_{63} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O^L_{\bar{\nu}_\tau},\quad O^R_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,8,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,$$
$$N^o_{e\bar{\nu}_e}=11,12,\quad N^o_{\mu\bar{\nu}_\mu}=13,14,\quad N^o_{\tau\bar{\nu}_\tau}=15 \to N_{\bar{\nu}_\epsilon}=4,4,\quad N_{\bar{\nu}_e}=4,4,\quad N_{\bar{\nu}_\mu}=4,4,$$
$$N_{\bar{\nu}_\tau}=1,1,\quad N_{\epsilon\bar{\nu}_\epsilon}=14,14,\quad N_{e\bar{\nu}_e}=13,13,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Gd^{157}_{64} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,\quad N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14,15 \to N_{\bar{\nu}_\epsilon}=5,5,\quad N_{\bar{\nu}_e}=5,5,$$
$$N_{\bar{\nu}_\mu}=4,4,\quad N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=9,9,\quad N_{e\bar{\nu}_e}=8,8,\quad N_{\mu\bar{\nu}_\mu}=8,8,\quad N_{\tau\bar{\nu}_\tau}=7,7,$$

$$Tb^{159}_{65} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14 \to N_{\bar{\nu}_\epsilon}=5,5,\quad N_{\bar{\nu}_e}=5,5,\quad N_{\bar{\nu}_\mu}=4,4,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=14,14,\quad N_{e\bar{\nu}_e}=14,14,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Dy^{162}_{66} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O^L_{\bar{\nu}_\tau},\quad O^R_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,\quad N^o_{e\bar{\nu}_e}=11,12,\quad N^o_{\mu\bar{\nu}_\mu}=13,14,\quad N^o_{\tau\bar{\nu}_\tau}=15,16 \to N_{\bar{\nu}_\epsilon}=5,5,\quad N_{\bar{\nu}_e}=4,4,$$
$$N_{\bar{\nu}_\mu}=3,3,\quad N_{\bar{\nu}_\tau}=3,3,\quad N_{\epsilon\bar{\nu}_\epsilon}=9,9,\quad N_{e\bar{\nu}_e}=9,9,\quad N_{\mu\bar{\nu}_\mu}=8,8,\quad N_{\tau\bar{\nu}_\tau}=7,7,$$

$$Ho^{165}_{67} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14 \to N_{\bar{\nu}_\epsilon}=5,5,\quad N_{\bar{\nu}_e}=5,5,\quad N_{\bar{\nu}_\mu}=5,5,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=15,15,\quad N_{e\bar{\nu}_e}=14,14,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Er^{167}_{68} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,\quad N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14,15 \to N_{\bar{\nu}_\epsilon}=5,5,\quad N_{\bar{\nu}_e}=5,5,$$
$$N_{\bar{\nu}_\mu}=5,5,\quad N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=10,10,\quad N_{e\bar{\nu}_e}=9,9,\quad N_{\mu\bar{\nu}_\mu}=8,8,\quad N_{\tau\bar{\nu}_\tau}=7,7,$$

$$Tu^{169}_{69} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14 \to N_{\bar{\nu}_\epsilon}=5,5,\quad N_{\bar{\nu}_e}=5,5,\quad N_{\bar{\nu}_\mu}=5,5,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=15,15,\quad N_{e\bar{\nu}_e}=15,15,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Yb^{173}_{70} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,\quad N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14,15 \to N_{\bar{\nu}_\epsilon}=6,6,\quad N_{\bar{\nu}_e}=5,5,$$
$$N_{\bar{\nu}_\mu}=5,5,\quad N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=10,10,\quad N_{e\bar{\nu}_e}=9,9,\quad N_{\mu\bar{\nu}_\mu}=8,8,\quad N_{\tau\bar{\nu}_\tau}=8,8,$$

$$Lu^{175}_{71} \to O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$
$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14 \to N_{\bar{\nu}_\epsilon}=6,6,\quad N_{\bar{\nu}_e}=5,5,\quad N_{\bar{\nu}_\mu}=5,5,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=16,16,\quad N_{e\bar{\nu}_e}=15,15,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1.$$

As we see, either the boson or the antineutrino orbits corresponding in atoms to the muonic and tauonic families suffer a strong change in quantity of their objects at the transition between the atomic systems. This becomes possible owing to an orbit quantized sequence principle.

To further reveal this feature, it is desirable to present here an orbital structure of atomic systems with mass numbers from 178 to 227 in an explicit form

$$Hf^{178}_{72} \rightarrow O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O^L_{\bar{\nu}_\tau}, \quad O^R_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O^L_{\tau\bar{\nu}_\tau}, \quad O^R_{\tau\bar{\nu}_\tau} \rightarrow N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7,8,$$

$$N^o_{\epsilon\bar{\nu}_\epsilon} = 9,10, \quad N^o_{e\bar{\nu}_e} = 11,12, \quad N^o_{\mu\bar{\nu}_\mu} = 13,14, \quad N^o_{\tau\bar{\nu}_\tau} = 15,16 \rightarrow N_{\bar{\nu}_\epsilon} = 5,5, \quad N_{\bar{\nu}_e} = 5,5,$$

$$N_{\bar{\nu}_\mu} = 4,4, \quad N_{\bar{\nu}_\tau} = 3,3, \quad N_{\epsilon\bar{\nu}_\epsilon} = 10,10, \quad N_{e\bar{\nu}_e} = 9,9, \quad N_{\mu\bar{\nu}_\mu} = 9,9, \quad N_{\tau\bar{\nu}_\tau} = 8,8,$$

$$Tu^{181}_{73} \rightarrow O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O_{\tau\bar{\nu}_\tau} \rightarrow N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 8,9,$$

$$N^o_{e\bar{\nu}_e} = 10,11, \quad N^o_{\mu\bar{\nu}_\mu} = 12,13, \quad N^o_{\tau\bar{\nu}_\tau} = 14 \rightarrow N_{\bar{\nu}_\epsilon} = 6,6, \quad N_{\bar{\nu}_e} = 6,6, \quad N_{\bar{\nu}_\mu} = 5,5,$$

$$N_{\bar{\nu}_\tau} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 16,16, \quad N_{e\bar{\nu}_e} = 16,16, \quad N_{\mu\bar{\nu}_\mu} = 4,4, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$W^{184}_{74} \rightarrow O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O^L_{\bar{\nu}_\tau}, \quad O^R_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O^L_{\tau\bar{\nu}_\tau}, \quad O^R_{\tau\bar{\nu}_\tau} \rightarrow N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7,8,$$

$$N^o_{\epsilon\bar{\nu}_\epsilon} = 9,10, \quad N^o_{e\bar{\nu}_e} = 11,12, \quad N^o_{\mu\bar{\nu}_\mu} = 13,14, \quad N^o_{\tau\bar{\nu}_\tau} = 15,16 \rightarrow N_{\bar{\nu}_\epsilon} = 5,5, \quad N_{\bar{\nu}_e} = 5,5,$$

$$N_{\bar{\nu}_\mu} = 4,4, \quad N_{\bar{\nu}_\tau} = 4,4, \quad N_{\epsilon\bar{\nu}_\epsilon} = 10,10, \quad N_{e\bar{\nu}_e} = 10,10, \quad N_{\mu\bar{\nu}_\mu} = 9,9, \quad N_{\tau\bar{\nu}_\tau} = 8,8,$$

$$Re^{186}_{75} \rightarrow O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O^L_{\bar{\nu}_\tau}, \quad O^R_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O_{\tau\bar{\nu}_\tau} \rightarrow N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7,8, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 9,10,$$

$$N^o_{e\bar{\nu}_e} = 11,12, \quad N^o_{\mu\bar{\nu}_\mu} = 13,14, \quad N^o_{\tau\bar{\nu}_\tau} = 15 \rightarrow N_{\bar{\nu}_\epsilon} = 6,6, \quad N_{\bar{\nu}_e} = 6,6, \quad N_{\bar{\nu}_\mu} = 5,5,$$

$$N_{\bar{\nu}_\tau} = 1,1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 17,17, \quad N_{e\bar{\nu}_e} = 16,16, \quad N_{\mu\bar{\nu}_\mu} = 4,4, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Os^{190}_{76} \rightarrow O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O^L_{\bar{\nu}_\tau}, \quad O^R_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O^L_{\tau\bar{\nu}_\tau}, \quad O^R_{\tau\bar{\nu}_\tau} \rightarrow N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7,8,$$

$$N^o_{\epsilon\bar{\nu}_\epsilon} = 9,10, \quad N^o_{e\bar{\nu}_e} = 11,12, \quad N^o_{\mu\bar{\nu}_\mu} = 13,14, \quad N^o_{\tau\bar{\nu}_\tau} = 15,16 \rightarrow N_{\bar{\nu}_\epsilon} = 5,5, \quad N_{\bar{\nu}_e} = 5,5,$$

$$N_{\bar{\nu}_\mu} = 5,5, \quad N_{\bar{\nu}_\tau} = 4,4, \quad N_{\epsilon\bar{\nu}_\epsilon} = 11,11, \quad N_{e\bar{\nu}_e} = 10,10, \quad N_{\mu\bar{\nu}_\mu} = 9,9, \quad N_{\tau\bar{\nu}_\tau} = 8,8,$$

$$Ir^{192}_{77} \rightarrow O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O^L_{\bar{\nu}_\tau}, \quad O^R_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon}, \quad O^L_{e\bar{\nu}_e}, \quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu}, \quad O^R_{\mu\bar{\nu}_\mu}, \quad O_{\tau\bar{\nu}_\tau} \rightarrow N^o_{\bar{\nu}_\epsilon} = 1,2, \quad N^o_{\bar{\nu}_e} = 3,4 \quad N^o_{\bar{\nu}_\mu} = 5,6, \quad N^o_{\bar{\nu}_\tau} = 7,8, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 9,10,$$

$$N^o_{e\bar{\nu}_e} = 11,12, \quad N^o_{\mu\bar{\nu}_\mu} = 13,14, \quad N^o_{\tau\bar{\nu}_\tau} = 15 \rightarrow N_{\bar{\nu}_\epsilon} = 6,6, \quad N_{\bar{\nu}_e} = 6,6, \quad N_{\bar{\nu}_\mu} = 6,6,$$

$$N_{\bar{\nu}_\tau} = 1,1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 17,17, \quad N_{e\bar{\nu}_e} = 17,17, \quad N_{\mu\bar{\nu}_\mu} = 4,4, \quad N_{\tau\bar{\nu}_\tau} = 1,$$

$$Pt^{195}_{78} \to O^L_{\bar\nu_\epsilon},\ \ O^R_{\bar\nu_\epsilon},\ \ O^L_{\bar\nu_e},\ \ O^R_{\bar\nu_e},\ \ O^L_{\bar\nu_\mu},\ \ O^R_{\bar\nu_\mu},\ \ O_{\bar\nu_\tau},\ \ O^L_{\epsilon\bar\nu_\epsilon},\ \ O^R_{\epsilon\bar\nu_\epsilon},\ \ O^L_{e\bar\nu_e},\ \ O^R_{e\bar\nu_e},$$

$$O^L_{\mu\bar\nu_\mu},\ \ O^R_{\mu\bar\nu_\mu},\ \ O^L_{\tau\bar\nu_\tau},\ \ O^R_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1,2,\ \ N^o_{\bar\nu_e} = 3,4\ \ N^o_{\bar\nu_\mu} = 5,6,\ \ N^o_{\bar\nu_\tau} = 7,$$
$$N^o_{\epsilon\bar\nu_\epsilon} = 8,9,\ \ N^o_{e\bar\nu_e} = 10,11,\ \ N^o_{\mu\bar\nu_\mu} = 12,13,\ \ N^o_{\tau\bar\nu_\tau} = 14,15 \to N_{\bar\nu_\epsilon} = 7,7,\ \ N_{\bar\nu_e} = 6,6,$$
$$N_{\bar\nu_\mu} = 6,6,\ \ N_{\bar\nu_\tau} = 1,\ \ N_{\epsilon\bar\nu_\epsilon} = 11,11,\ \ N_{e\bar\nu_e} = 10,10,\ \ N_{\mu\bar\nu_\mu} = 9,9,\ \ N_{\tau\bar\nu_\tau} = 9,9,$$

$$Au^{197}_{79} \to O^L_{\bar\nu_\epsilon},\ \ O^R_{\bar\nu_\epsilon},\ \ O^L_{\bar\nu_e},\ \ O^R_{\bar\nu_e},\ \ O^L_{\bar\nu_\mu},\ \ O^R_{\bar\nu_\mu},\ \ O_{\bar\nu_\tau},\ \ O^L_{\epsilon\bar\nu_\epsilon},\ \ O^R_{\epsilon\bar\nu_\epsilon},\ \ O^L_{e\bar\nu_e},\ \ O^R_{e\bar\nu_e},$$

$$O^L_{\mu\bar\nu_\mu},\ \ O^R_{\mu\bar\nu_\mu},\ \ O_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1,2,\ \ N^o_{\bar\nu_e} = 3,4\ \ N^o_{\bar\nu_\mu} = 5,6,\ \ N^o_{\bar\nu_\tau} = 7,\ \ N^o_{\epsilon\bar\nu_\epsilon} = 8,9,$$
$$N^o_{e\bar\nu_e} = 10,11,\ \ N^o_{\mu\bar\nu_\mu} = 12,13,\ \ N^o_{\tau\bar\nu_\tau} = 14 \to N_{\bar\nu_\epsilon} = 7,7,\ \ N_{\bar\nu_e} = 6,6,\ \ N_{\bar\nu_\mu} = 6,6,$$
$$N_{\bar\nu_\tau} = 1,\ \ N_{\epsilon\bar\nu_\epsilon} = 18,18,\ \ N_{e\bar\nu_e} = 17,17,\ \ N_{\mu\bar\nu_\mu} = 4,4,\ \ N_{\tau\bar\nu_\tau} = 1,$$

$$Hg^{200}_{80} \to O^L_{\bar\nu_\epsilon},\ \ O^R_{\bar\nu_\epsilon},\ \ O^L_{\bar\nu_e},\ \ O^R_{\bar\nu_e},\ \ O^L_{\bar\nu_\mu},\ \ O^R_{\bar\nu_\mu},\ \ O^L_{\bar\nu_\tau},\ \ O^R_{\bar\nu_\tau},\ \ O^L_{\epsilon\bar\nu_\epsilon},\ \ O^R_{\epsilon\bar\nu_\epsilon},\ \ O^L_{e\bar\nu_e},\ \ O^R_{e\bar\nu_e},$$

$$O^L_{\mu\bar\nu_\mu},\ \ O^R_{\mu\bar\nu_\mu},\ \ O^L_{\tau\bar\nu_\tau},\ \ O^R_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1,2,\ \ N^o_{\bar\nu_e} = 3,4\ \ N^o_{\bar\nu_\mu} = 5,6,\ \ N^o_{\bar\nu_\tau} = 7,8,$$
$$N^o_{\epsilon\bar\nu_\epsilon} = 9,10,\ \ N^o_{e\bar\nu_e} = 11,12,\ \ N^o_{\mu\bar\nu_\mu} = 13,14,\ \ N^o_{\tau\bar\nu_\tau} = 15,16 \to N_{\bar\nu_\epsilon} = 6,6,\ \ N_{\bar\nu_e} = 5,5,$$
$$N_{\bar\nu_\mu} = 5,5,\ \ N_{\bar\nu_\tau} = 4,4,\ \ N_{\epsilon\bar\nu_\epsilon} = 11,11,\ \ N_{e\bar\nu_e} = 10,10,\ \ N_{\mu\bar\nu_\mu} = 10,10,\ \ N_{\tau\bar\nu_\tau} = 9,9,$$

$$Tl^{204}_{81} \to O^L_{\bar\nu_\epsilon},\ \ O^R_{\bar\nu_\epsilon},\ \ O^L_{\bar\nu_e},\ \ O^R_{\bar\nu_e},\ \ O^L_{\bar\nu_\mu},\ \ O^R_{\bar\nu_\mu},\ \ O^L_{\bar\nu_\tau},\ \ O^R_{\bar\nu_\tau},\ \ O^L_{\epsilon\bar\nu_\epsilon},\ \ O^R_{\epsilon\bar\nu_\epsilon},\ \ O^L_{e\bar\nu_e},\ \ O^R_{e\bar\nu_e},$$

$$O^L_{\mu\bar\nu_\mu},\ \ O^R_{\mu\bar\nu_\mu},\ \ O_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1,2,\ \ N^o_{\bar\nu_e} = 3,4\ \ N^o_{\bar\nu_\mu} = 5,6,\ \ N^o_{\bar\nu_\tau} = 7,8,\ \ N^o_{\epsilon\bar\nu_\epsilon} = 9,10,$$
$$N^o_{e\bar\nu_e} = 11,12,\ \ N^o_{\mu\bar\nu_\mu} = 13,14,\ \ N^o_{\tau\bar\nu_\tau} = 15 \to N_{\bar\nu_\epsilon} = 7,7,\ \ N_{\bar\nu_e} = 7,7,\ \ N_{\bar\nu_\mu} = 6,6,$$
$$N_{\bar\nu_\tau} = 1,1,\ \ N_{\epsilon\bar\nu_\epsilon} = 18,18,\ \ N_{e\bar\nu_e} = 18,18,\ \ N_{\mu\bar\nu_\mu} = 4,4,\ \ N_{\tau\bar\nu_\tau} = 1,$$

$$Pb^{207}_{82} \to O^L_{\bar\nu_\epsilon},\ \ O^R_{\bar\nu_\epsilon},\ \ O^L_{\bar\nu_e},\ \ O^R_{\bar\nu_e},\ \ O^L_{\bar\nu_\mu},\ \ O^R_{\bar\nu_\mu},\ \ O_{\bar\nu_\tau},\ \ O^L_{\epsilon\bar\nu_\epsilon},\ \ O^R_{\epsilon\bar\nu_\epsilon},\ \ O^L_{e\bar\nu_e},\ \ O^R_{e\bar\nu_e},$$

$$O^L_{\mu\bar\nu_\mu},\ \ O^R_{\mu\bar\nu_\mu},\ \ O^L_{\tau\bar\nu_\tau},\ \ O^R_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1,2,\ \ N^o_{\bar\nu_e} = 3,4\ \ N^o_{\bar\nu_\mu} = 5,6,\ \ N^o_{\bar\nu_\tau} = 7,$$
$$N^o_{\epsilon\bar\nu_\epsilon} = 8,9,\ \ N^o_{e\bar\nu_e} = 10,11,\ \ N^o_{\mu\bar\nu_\mu} = 12,13,\ \ N^o_{\tau\bar\nu_\tau} = 14,15 \to N_{\bar\nu_\epsilon} = 7,7,\ \ N_{\bar\nu_e} = 7,7,$$
$$N_{\bar\nu_\mu} = 7,7,\ \ N_{\bar\nu_\tau} = 1,\ \ N_{\epsilon\bar\nu_\epsilon} = 11,11,\ \ N_{e\bar\nu_e} = 10,10,\ \ N_{\mu\bar\nu_\mu} = 10,10,\ \ N_{\tau\bar\nu_\tau} = 10,10,$$

$$Bi^{209}_{83} \to O^L_{\bar\nu_\epsilon},\ \ O^R_{\bar\nu_\epsilon},\ \ O^L_{\bar\nu_e},\ \ O^R_{\bar\nu_e},\ \ O^L_{\bar\nu_\mu},\ \ O^R_{\bar\nu_\mu},\ \ O_{\bar\nu_\tau},\ \ O^L_{\epsilon\bar\nu_\epsilon},\ \ O^R_{\epsilon\bar\nu_\epsilon},\ \ O^L_{e\bar\nu_e},\ \ O^R_{e\bar\nu_e},$$

$$O^L_{\mu\bar\nu_\mu},\ \ O^R_{\mu\bar\nu_\mu},\ \ O_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1,2,\ \ N^o_{\bar\nu_e} = 3,4\ \ N^o_{\bar\nu_\mu} = 5,6,\ \ N^o_{\bar\nu_\tau} = 7,\ \ N^o_{\epsilon\bar\nu_\epsilon} = 8,9,$$
$$N^o_{e\bar\nu_e} = 10,11,\ \ N^o_{\mu\bar\nu_\mu} = 12,13,\ \ N^o_{\tau\bar\nu_\tau} = 14 \to N_{\bar\nu_\epsilon} = 7,7,\ \ N_{\bar\nu_e} = 7,7,\ \ N_{\bar\nu_\mu} = 7,7,$$
$$N_{\bar\nu_\tau} = 1,\ \ N_{\epsilon\bar\nu_\epsilon} = 19,19,\ \ N_{e\bar\nu_e} = 18,18,\ \ N_{\mu\bar\nu_\mu} = 4,4,\ \ N_{\tau\bar\nu_\tau} = 1,$$

$$Po^{209}_{84} \to O^L_{\bar\nu_\epsilon},\ \ O^R_{\bar\nu_\epsilon},\ \ O^L_{\bar\nu_e},\ \ O^R_{\bar\nu_e},\ \ O^L_{\bar\nu_\mu},\ \ O^R_{\bar\nu_\mu},\ \ O_{\bar\nu_\tau},\ \ O^L_{\epsilon\bar\nu_\epsilon},\ \ O^R_{\epsilon\bar\nu_\epsilon},\ \ O^L_{e\bar\nu_e},\ \ O^R_{e\bar\nu_e},$$

$$O^L_{\mu\bar\nu_\mu},\ \ O^R_{\mu\bar\nu_\mu},\ \ O^L_{\tau\bar\nu_\tau},\ \ O^R_{\tau\bar\nu_\tau} \to N^o_{\bar\nu_\epsilon} = 1,2,\ \ N^o_{\bar\nu_e} = 3,4\ \ N^o_{\bar\nu_\mu} = 5,6,\ \ N^o_{\bar\nu_\tau} = 7,$$
$$N^o_{\epsilon\bar\nu_\epsilon} = 8,9,\ \ N^o_{e\bar\nu_e} = 10,11,\ \ N^o_{\mu\bar\nu_\mu} = 12,13,\ \ N^o_{\tau\bar\nu_\tau} = 14,15 \to N_{\bar\nu_\epsilon} = 7,7,\ \ N_{\bar\nu_e} = 7,7,$$

$$N_{\bar{\nu}_\mu}=6,6,\quad N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=11,11,\quad N_{e\bar{\nu}_e}=11,11,\quad N_{\mu\bar{\nu}_\mu}=10,10,\quad N_{\tau\bar{\nu}_\tau}=10,10,$$

$$At^{210}_{85}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O^L_{\bar{\nu}_\tau},\quad O^R_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,8,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,$$
$$N^o_{e\bar{\nu}_e}=11,12,\quad N^o_{\mu\bar{\nu}_\mu}=13,14,\quad N^o_{\tau\bar{\nu}_\tau}=15\rightarrow N_{\bar{\nu}_\epsilon}=6,6,\quad N_{\bar{\nu}_e}=5,5,\quad N_{\bar{\nu}_\mu}=5,5,$$
$$N_{\bar{\nu}_\tau}=4,4,\quad N_{\epsilon\bar{\nu}_\epsilon}=19,19,\quad N_{e\bar{\nu}_e}=19,19,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Rn^{222}_{86}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O^L_{\bar{\nu}_\tau},\quad O^R_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,\quad N^o_{e\bar{\nu}_e}=11,12,\quad N^o_{\mu\bar{\nu}_\mu}=13,14,\quad N^o_{\tau\bar{\nu}_\tau}=15,16\rightarrow N_{\bar{\nu}_\epsilon}=7,7,\quad N_{\bar{\nu}_e}=6,6,$$
$$N_{\bar{\nu}_\mu}=6,6,\quad N_{\bar{\nu}_\tau}=6,6,\quad N_{\epsilon\bar{\nu}_\epsilon}=11,11,\quad N_{e\bar{\nu}_e}=11,11,\quad N_{\mu\bar{\nu}_\mu}=11,11,\quad N_{\tau\bar{\nu}_\tau}=10,10,$$

$$Fr^{223}_{87}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14\rightarrow N_{\bar{\nu}_\epsilon}=8,8,\quad N_{\bar{\nu}_e}=8,8,\quad N_{\bar{\nu}_\mu}=8,8,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=20,20,\quad N_{e\bar{\nu}_e}=19,19,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Ra^{226}_{88}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O^L_{\bar{\nu}_\tau},\quad O^R_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,\quad N^o_{e\bar{\nu}_e}=11,12,\quad N^o_{\mu\bar{\nu}_\mu}=13,14,\quad N^o_{\tau\bar{\nu}_\tau}=15,16\rightarrow N_{\bar{\nu}_\epsilon}=7,7,\quad N_{\bar{\nu}_e}=6,6,$$
$$N_{\bar{\nu}_\mu}=6,6,\quad N_{\bar{\nu}_\tau}=6,6,\quad N_{\epsilon\bar{\nu}_\epsilon}=12,12,\quad N_{e\bar{\nu}_e}=11,11,\quad N_{\mu\bar{\nu}_\mu}=11,11,\quad N_{\tau\bar{\nu}_\tau}=10,10,$$

$$Ac^{227}_{89}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,\quad N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\quad N^o_{\mu\bar{\nu}_\mu}=12,13,\quad N^o_{\tau\bar{\nu}_\tau}=14\rightarrow N_{\bar{\nu}_\epsilon}=8,8,\quad N_{\bar{\nu}_e}=8,8,\quad N_{\bar{\nu}_\mu}=8,8,$$
$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=20,20,\quad N_{e\bar{\nu}_e}=20,20,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1.$$

This shows that an orbit quantized sequence does not change even at the transition from one light atomic system into another, heavier one.

For completeness we present here a structural picture of atoms with atomic numbers from 90 to 103 in a disclosed form

$$Th^{232}_{90}\rightarrow O^L_{\bar{\nu}_\epsilon},\quad O^R_{\bar{\nu}_\epsilon},\quad O^L_{\bar{\nu}_e},\quad O^R_{\bar{\nu}_e},\quad O^L_{\bar{\nu}_\mu},\quad O^R_{\bar{\nu}_\mu},\quad O^L_{\bar{\nu}_\tau},\quad O^R_{\bar{\nu}_\tau},\quad O^L_{\epsilon\bar{\nu}_\epsilon},\quad O^R_{\epsilon\bar{\nu}_\epsilon},\quad O^L_{e\bar{\nu}_e},\quad O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\quad O^R_{\mu\bar{\nu}_\mu},\quad O^L_{\tau\bar{\nu}_\tau},\quad O^R_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\quad N^o_{\bar{\nu}_e}=3,4\quad N^o_{\bar{\nu}_\mu}=5,6,\quad N^o_{\bar{\nu}_\tau}=7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,\quad N^o_{e\bar{\nu}_e}=11,12,\quad N^o_{\mu\bar{\nu}_\mu}=13,14,\quad N^o_{\tau\bar{\nu}_\tau}=15,16\rightarrow N_{\bar{\nu}_\epsilon}=7,7,\quad N_{\bar{\nu}_e}=7,7,$$
$$N_{\bar{\nu}_\mu}=6,6,\quad N_{\bar{\nu}_\tau}=6,6,\quad N_{\epsilon\bar{\nu}_\epsilon}=12,12,\quad N_{e\bar{\nu}_e}=12,12,\quad N_{\mu\bar{\nu}_\mu}=11,11,\quad N_{\tau\bar{\nu}_\tau}=10,10,$$

$$Pa^{231}_{91} \to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\ \ O^R_{\mu\bar{\nu}_\mu},\ \ O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2,\ \ N^o_{\bar{\nu}_e} = 3,4\ \ N^o_{\bar{\nu}_\mu} = 5,6,\ \ N^o_{\bar{\nu}_\tau} = 7,\ \ N^o_{\epsilon\bar{\nu}_\epsilon} = 8,9,$$
$$N^o_{e\bar{\nu}_e} = 10,11,\ \ N^o_{\mu\bar{\nu}_\mu} = 12,13,\ \ N^o_{\tau\bar{\nu}_\tau} = 14 \to N_{\bar{\nu}_\epsilon} = 8,8,\ \ N_{\bar{\nu}_e} = 8,8,\ \ N_{\bar{\nu}_\mu} = 8,8,$$
$$N_{\bar{\nu}_\tau} = 1,\ \ N_{\epsilon\bar{\nu}_\epsilon} = 21,21,\ \ N_{e\bar{\nu}_e} = 20,20,\ \ N_{\mu\bar{\nu}_\mu} = 4,4,\ \ N_{\tau\bar{\nu}_\tau} = 1,$$

$$U^{238}_{92} \to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O^L_{\bar{\nu}_\tau},\ \ O^R_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu}, O^R_{\mu\bar{\nu}_\mu},\ \ O^L_{\tau\bar{\nu}_\tau},\ \ O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2,\ \ N^o_{\bar{\nu}_e} = 3,4\ \ N^o_{\bar{\nu}_\mu} = 5,6,\ \ N^o_{\bar{\nu}_\tau} = 7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon} = 9,10,\ \ N^o_{e\bar{\nu}_e} = 11,12,\ \ N^o_{\mu\bar{\nu}_\mu} = 13,14,\ \ N^o_{\tau\bar{\nu}_\tau} = 15,16 \to N_{\bar{\nu}_\epsilon} = 8,8,\ \ N_{\bar{\nu}_e} = 7,7,$$
$$N_{\bar{\nu}_\mu} = 6,6,\ \ N_{\bar{\nu}_\tau} = 6,6,\ \ N_{\epsilon\bar{\nu}_\epsilon} = 13,13,\ \ N_{e\bar{\nu}_e} = 12,12,\ \ N_{\mu\bar{\nu}_\mu} = 11,11,\ \ N_{\tau\bar{\nu}_\tau} = 10,10,$$

$$Np^{237}_{93} \to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\ \ O^R_{\mu\bar{\nu}_\mu},\ \ O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2,\ \ N^o_{\bar{\nu}_e} = 3,4\ \ N^o_{\bar{\nu}_\mu} = 5,6,\ \ N^o_{\bar{\nu}_\tau} = 7,\ \ N^o_{\epsilon\bar{\nu}_\epsilon} = 8,9,$$
$$N^o_{e\bar{\nu}_e} = 10,11,\ \ N^o_{\mu\bar{\nu}_\mu} = 12,13,\ \ N^o_{\tau\bar{\nu}_\tau} = 14 \to N_{\bar{\nu}_\epsilon} = 9,9,\ \ N_{\bar{\nu}_e} = 8,8,\ \ N_{\bar{\nu}_\mu} = 8,8,$$
$$N_{\bar{\nu}_\tau} = 1,\ \ N_{\epsilon\bar{\nu}_\epsilon} = 21,21,\ \ N_{e\bar{\nu}_e} = 21,21,\ \ N_{\mu\bar{\nu}_\mu} = 4,4,\ \ N_{\tau\bar{\nu}_\tau} = 1,$$

$$Pu^{244}_{94} \to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O^L_{\bar{\nu}_\tau},\ \ O^R_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\ \ O^R_{\mu\bar{\nu}_\mu},\ \ O^L_{\tau\bar{\nu}_\tau},\ \ O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2,\ \ N^o_{\bar{\nu}_e} = 3,4\ \ N^o_{\bar{\nu}_\mu} = 5,6,\ \ N^o_{\bar{\nu}_\tau} = 7,8,$$
$$N^o_{\epsilon\bar{\nu}_\epsilon} = 9,10,\ \ N^o_{e\bar{\nu}_e} = 11,12,\ \ N^o_{\mu\bar{\nu}_\mu} = 13,14,\ \ N^o_{\tau\bar{\nu}_\tau} = 15,16 \to N_{\bar{\nu}_\epsilon} = 8,8,\ \ N_{\bar{\nu}_e} = 7,7,$$
$$N_{\bar{\nu}_\mu} = 7,7,\ \ N_{\bar{\nu}_\tau} = 6,6,\ \ N_{\epsilon\bar{\nu}_\epsilon} = 13,13,\ \ N_{e\bar{\nu}_e} = 12,12,\ \ N_{\mu\bar{\nu}_\mu} = 11,11,\ \ N_{\tau\bar{\nu}_\tau} = 11,11,$$

$$Am^{243}_{95} \to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\ \ O^R_{\mu\bar{\nu}_\mu},\ \ O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2,\ \ N^o_{\bar{\nu}_e} = 3,4\ \ N^o_{\bar{\nu}_\mu} = 5,6,\ \ N^o_{\bar{\nu}_\tau} = 7,\ \ N^o_{\epsilon\bar{\nu}_\epsilon} = 8,9,$$
$$N^o_{e\bar{\nu}_e} = 10,11,\ \ N^o_{\mu\bar{\nu}_\mu} = 12,13,\ \ N^o_{\tau\bar{\nu}_\tau} = 14 \to N_{\bar{\nu}_\epsilon} = 9,9,\ \ N_{\bar{\nu}_e} = 9,9,\ \ N_{\bar{\nu}_\mu} = 8,8,$$
$$N_{\bar{\nu}_\tau} = 1,\ \ N_{\epsilon\bar{\nu}_\epsilon} = 22,22,\ \ N_{e\bar{\nu}_e} = 21,21,\ \ N_{\mu\bar{\nu}_\mu} = 4,4,\ \ N_{\tau\bar{\nu}_\tau} = 1,$$

$$Cm^{247}_{96} \to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},\ \ O^L_{\mu\bar{\nu}_\mu},$$

$$O^R_{\mu\bar{\nu}_\mu},\ \ O^L_{\tau\bar{\nu}_\tau},\ \ O^R_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2,\ \ N^o_{\bar{\nu}_e} = 3,4\ \ N^o_{\bar{\nu}_\mu} = 5,6,\ \ N^o_{\bar{\nu}_\tau} = 7,\ \ N^o_{\epsilon\bar{\nu}_\epsilon} = 8,9,$$
$$N^o_{e\bar{\nu}_e} = 10,11,\ \ N^o_{\mu\bar{\nu}_\mu} = 12,13,\ \ N^o_{\tau\bar{\nu}_\tau} = 14,15 \to N_{\bar{\nu}_\epsilon} = 10,10,\ \ N_{\bar{\nu}_e} = 9,9,\ \ N_{\bar{\nu}_\mu} = 8,8,$$
$$N_{\bar{\nu}_\tau} = 1,\ \ N_{\epsilon\bar{\nu}_\epsilon} = 13,13,\ \ N_{e\bar{\nu}_e} = 12,12,\ \ N_{\mu\bar{\nu}_\mu} = 12,12,\ \ N_{\tau\bar{\nu}_\tau} = 11,11,$$

$$Bk^{247}_{97} \to O^L_{\bar{\nu}_\epsilon},\ \ O^R_{\bar{\nu}_\epsilon},\ \ O^L_{\bar{\nu}_e},\ \ O^R_{\bar{\nu}_e},\ \ O^L_{\bar{\nu}_\mu},\ \ O^R_{\bar{\nu}_\mu},\ \ O_{\bar{\nu}_\tau},\ \ O^L_{\epsilon\bar{\nu}_\epsilon},\ \ O^R_{\epsilon\bar{\nu}_\epsilon},\ \ O^L_{e\bar{\nu}_e},\ \ O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\ \ O^R_{\mu\bar{\nu}_\mu},\ \ O_{\tau\bar{\nu}_\tau} \to N^o_{\bar{\nu}_\epsilon} = 1,2,\ \ N^o_{\bar{\nu}_e} = 3,4\ \ N^o_{\bar{\nu}_\mu} = 5,6,\ \ N^o_{\bar{\nu}_\tau} = 7,\ \ N^o_{\epsilon\bar{\nu}_\epsilon} = 8,9,$$
$$N^o_{e\bar{\nu}_e} = 10,11,\ \ N^o_{\mu\bar{\nu}_\mu} = 12,13,\ \ N^o_{\tau\bar{\nu}_\tau} = 14 \to N_{\bar{\nu}_\epsilon} = 9,9,\ \ N_{\bar{\nu}_e} = 9,9,\ \ N_{\bar{\nu}_\mu} = 8,8,$$

$$N_{\bar{\nu}_\tau}=1,\quad N_{\epsilon\bar{\nu}_\epsilon}=22,22,\quad N_{e\bar{\nu}_e}=22,22,\quad N_{\mu\bar{\nu}_\mu}=4,4,\quad N_{\tau\bar{\nu}_\tau}=1,$$

$$Cf_{98}^{251}\rightarrow O^L_{\bar{\nu}_\epsilon},\ O^R_{\bar{\nu}_\epsilon},\ O^L_{\bar{\nu}_e},\ O^R_{\bar{\nu}_e},\ O^L_{\bar{\nu}_\mu},\ O^R_{\bar{\nu}_\mu},\ O_{\bar{\nu}_\tau},\ O^L_{\epsilon\bar{\nu}_\epsilon},\ O^R_{\epsilon\bar{\nu}_\epsilon},\ O^L_{e\bar{\nu}_e},\ O^R_{e\bar{\nu}_e},\ O^L_{\mu\bar{\nu}_\mu},$$

$$O^R_{\mu\bar{\nu}_\mu},\ O^L_{\tau\bar{\nu}_\tau},\ O^R_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\ N^o_{\bar{\nu}_e}=3,4\ N^o_{\bar{\nu}_\mu}=5,6,\ N^o_{\bar{\nu}_\tau}=7,\ N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\ N^o_{\mu\bar{\nu}_\mu}=12,13,\ N^o_{\tau\bar{\nu}_\tau}=14,15\rightarrow N_{\bar{\nu}_\epsilon}=10,10,\ N_{\bar{\nu}_e}=9,9,\ N_{\bar{\nu}_\mu}=8,8,$$
$$N_{\bar{\nu}_\tau}=1,\ N_{\epsilon\bar{\nu}_\epsilon}=13,13,\ N_{e\bar{\nu}_e}=12,12,\ N_{\mu\bar{\nu}_\mu}=12,12,\ N_{\tau\bar{\nu}_\tau}=12,12,$$

$$Es_{99}^{254}\rightarrow O^L_{\bar{\nu}_\epsilon},\ O^R_{\bar{\nu}_\epsilon},\ O^L_{\bar{\nu}_e},\ O^R_{\bar{\nu}_e},\ O^L_{\bar{\nu}_\mu},\ O^R_{\bar{\nu}_\mu},\ O^L_{\bar{\nu}_\tau},\ O^R_{\bar{\nu}_\tau},\ O^L_{\epsilon\bar{\nu}_\epsilon},\ O^R_{\epsilon\bar{\nu}_\epsilon},\ O^L_{e\bar{\nu}_e},\ O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\ O^R_{\mu\bar{\nu}_\mu},\ O_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\ N^o_{\bar{\nu}_e}=3,4\ N^o_{\bar{\nu}_\mu}=5,6,\ N^o_{\bar{\nu}_\tau}=7,8,\ N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,$$
$$N^o_{e\bar{\nu}_e}=11,12,\ N^o_{\mu\bar{\nu}_\mu}=13,14,\ N^o_{\tau\bar{\nu}_\tau}=15\rightarrow N_{\bar{\nu}_\epsilon}=9,9,\ N_{\bar{\nu}_e}=9,9,\ N_{\bar{\nu}_\mu}=9,9,$$
$$N_{\bar{\nu}_\tau}=1,1,\ N_{\epsilon\bar{\nu}_\epsilon}=23,23,\ N_{e\bar{\nu}_e}=22,22,\ N_{\mu\bar{\nu}_\mu}=4,4,\ N_{\tau\bar{\nu}_\tau}=1,$$

$$Fm_{100}^{257}\rightarrow O^L_{\bar{\nu}_\epsilon},\ O^R_{\bar{\nu}_\epsilon},\ O^L_{\bar{\nu}_e},\ O^R_{\bar{\nu}_e},\ O^L_{\bar{\nu}_\mu},\ O^R_{\bar{\nu}_\mu},\ O_{\bar{\nu}_\tau},\ O^L_{\epsilon\bar{\nu}_\epsilon},\ O^R_{\epsilon\bar{\nu}_\epsilon},\ O^L_{e\bar{\nu}_e},\ O^R_{e\bar{\nu}_e},\ O^L_{\mu\bar{\nu}_\mu},$$

$$O^R_{\mu\bar{\nu}_\mu},\ O^L_{\tau\bar{\nu}_\tau},\ O^R_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\ N^o_{\bar{\nu}_e}=3,4\ N^o_{\bar{\nu}_\mu}=5,6,\ N^o_{\bar{\nu}_\tau}=7,\ N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\ N^o_{\mu\bar{\nu}_\mu}=12,13,\ N^o_{\tau\bar{\nu}_\tau}=14,15\rightarrow N_{\bar{\nu}_\epsilon}=10,10,\ N_{\bar{\nu}_e}=9,9,\ N_{\bar{\nu}_\mu}=9,9,$$
$$N_{\bar{\nu}_\tau}=1,\ N_{\epsilon\bar{\nu}_\epsilon}=13,13,\ N_{e\bar{\nu}_e}=13,13,\ N_{\mu\bar{\nu}_\mu}=12,12,\ N_{\tau\bar{\nu}_\tau}=12,12,$$

$$Md_{101}^{258}\rightarrow O^L_{\bar{\nu}_\epsilon},\ O^R_{\bar{\nu}_\epsilon},\ O^L_{\bar{\nu}_e},\ O^R_{\bar{\nu}_e},\ O^L_{\bar{\nu}_\mu},\ O^R_{\bar{\nu}_\mu},\ O^L_{\bar{\nu}_\tau},\ O^R_{\bar{\nu}_\tau},\ O^L_{\epsilon\bar{\nu}_\epsilon},\ O^R_{\epsilon\bar{\nu}_\epsilon},\ O^L_{e\bar{\nu}_e},\ O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\ O^R_{\mu\bar{\nu}_\mu},\ O_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\ N^o_{\bar{\nu}_e}=3,4\ N^o_{\bar{\nu}_\mu}=5,6,\ N^o_{\bar{\nu}_\tau}=7,8,\ N^o_{\epsilon\bar{\nu}_\epsilon}=9,10,$$
$$N^o_{e\bar{\nu}_e}=11,12,\ N^o_{\mu\bar{\nu}_\mu}=13,14,\ N^o_{\tau\bar{\nu}_\tau}=15\rightarrow N_{\bar{\nu}_\epsilon}=9,9,\ N_{\bar{\nu}_e}=9,9,\ N_{\bar{\nu}_\mu}=9,9,$$
$$N_{\bar{\nu}_\tau}=1,1,\ N_{\epsilon\bar{\nu}_\epsilon}=23,23,\ N_{e\bar{\nu}_e}=23,23,\ N_{\mu\bar{\nu}_\mu}=4,4,\ N_{\tau\bar{\nu}_\tau}=1,$$

$$No_{102}^{255}\rightarrow O^L_{\bar{\nu}_\epsilon},\ O^R_{\bar{\nu}_\epsilon},\ O^L_{\bar{\nu}_e},\ O^R_{\bar{\nu}_e},\ O^L_{\bar{\nu}_\mu},\ O^R_{\bar{\nu}_\mu},\ O_{\bar{\nu}_\tau},\ O^L_{\epsilon\bar{\nu}_\epsilon},\ O^R_{\epsilon\bar{\nu}_\epsilon},\ O^L_{e\bar{\nu}_e},\ O^R_{e\bar{\nu}_e},\ O^L_{\mu\bar{\nu}_\mu},$$

$$O^R_{\mu\bar{\nu}_\mu},\ O^L_{\tau\bar{\nu}_\tau},\ O^R_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\ N^o_{\bar{\nu}_e}=3,4\ N^o_{\bar{\nu}_\mu}=5,6,\ N^o_{\bar{\nu}_\tau}=7,\ N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\ N^o_{\mu\bar{\nu}_\mu}=12,13,\ N^o_{\tau\bar{\nu}_\tau}=14,15\rightarrow N_{\bar{\nu}_\epsilon}=9,9,\ N_{\bar{\nu}_e}=8,8,\ N_{\bar{\nu}_\mu}=8,8,$$
$$N_{\bar{\nu}_\tau}=1,\ N_{\epsilon\bar{\nu}_\epsilon}=13,13,\ N_{e\bar{\nu}_e}=13,13,\ N_{\mu\bar{\nu}_\mu}=13,13,\ N_{\tau\bar{\nu}_\tau}=12,12,$$

$$Lr_{103}^{256}\rightarrow O^L_{\bar{\nu}_\epsilon},\ O^R_{\bar{\nu}_\epsilon},\ O^L_{\bar{\nu}_e},\ O^R_{\bar{\nu}_e},\ O^L_{\bar{\nu}_\mu},\ O^R_{\bar{\nu}_\mu},\ O_{\bar{\nu}_\tau},\ O^L_{\epsilon\bar{\nu}_\epsilon},\ O^R_{\epsilon\bar{\nu}_\epsilon},\ O^L_{e\bar{\nu}_e},\ O^R_{e\bar{\nu}_e},$$

$$O^L_{\mu\bar{\nu}_\mu},\ O^R_{\mu\bar{\nu}_\mu},\ O_{\tau\bar{\nu}_\tau}\rightarrow N^o_{\bar{\nu}_\epsilon}=1,2,\ N^o_{\bar{\nu}_e}=3,4\ N^o_{\bar{\nu}_\mu}=5,6,\ N^o_{\bar{\nu}_\tau}=7,\ N^o_{\epsilon\bar{\nu}_\epsilon}=8,9,$$
$$N^o_{e\bar{\nu}_e}=10,11,\ N^o_{\mu\bar{\nu}_\mu}=12,13,\ N^o_{\tau\bar{\nu}_\tau}=14\rightarrow N_{\bar{\nu}_\epsilon}=9,9,\ N_{\bar{\nu}_e}=8,8,\ N_{\bar{\nu}_\mu}=8,8,$$
$$N_{\bar{\nu}_\tau}=1,\ N_{\epsilon\bar{\nu}_\epsilon}=24,24,\ N_{e\bar{\nu}_e}=23,23,\ N_{\mu\bar{\nu}_\mu}=4,4,\ N_{\tau\bar{\nu}_\tau}=1.$$

Thus, it follows that between the atomic orbits and leptonic families there exists a range of the structural connections in which appears a part of mass. This of course does not indicate the existence in nature of a transition from one atom into another regardless of what type of mass has important consequences for it.

4. Nature of a grand synthesis of nuclei

When an evrmion (antievrmion) interacts with an antiproton (proton), a force of atomic unification can, in conformity with symmetry laws, transform it into an orbital fermion. In this case, it is expected that a hydrogen (antihydrogen) H_Z^A ($\bar{H}_Z^A$) with the same orbit O_ϵ^L or O_ϵ^R will be formed through a grand lepton (antilepton) synthesis

$$\epsilon_{L,R}^- + p_{R,L}^+ \rightarrow H_1^1, \quad \epsilon_{R,L}^+ + p_{L,R}^- \rightarrow \bar{H}_1^1. \tag{45}$$

Of course, such transitions cannot contradict the conditions (33), which would seem to say that, among the set of atomic systems, one can find atoms of a single electron or muon orbit. This is, however, not in line with nature. Moreover, the motion of an evrmion in its orbit around a hydrogen nucleus H_1^1 originates within a warping field as a result of an interratio of intraatomic forces. They have the characteristic of attraction at the universal evrmion mass. In another mass dependence would appear their property of a repulsion.

But there are differences [14] in weak masses

$$m_\epsilon^W > m_e^W > m_\mu^W > m_p^W > m_\tau^W, \tag{46}$$

$$m_{\nu_\epsilon}^W > m_{\nu_e}^W > m_{\nu_\mu}^W > m_{\nu_\tau}^W > m_n^W \tag{47}$$

admitting the existence of a range of intraatomic weak transitions. An example for them may be naturally united processes

$$\epsilon_{L,R}^- + p_{R,L}^+ \rightarrow \nu_{\epsilon L,R} + n_{R,L}^+ + (\tau_{L,R}^-, \bar{\nu}_{\tau R,L}) + (\tau_{R,L}^+, \nu_{\tau L,R}), \tag{48}$$

$$\epsilon_{R,L}^+ + p_{L,R}^- \rightarrow \bar{\nu}_{\epsilon R,L} + n_{L,R}^- + (\tau_{L,R}^-, \bar{\nu}_{\tau R,L}) + (\tau_{R,L}^+, \nu_{\tau L,R}). \tag{49}$$

Here an important circumstance is that the decays

$$\epsilon_{L,R}^- \rightarrow \tau_{L,R}^- \bar{\nu}_{\tau R,L} \nu_{\epsilon L,R}, \quad \epsilon_{R,L}^+ \rightarrow \tau_{R,L}^+ \nu_{\tau L,R} \bar{\nu}_{\epsilon R,L}, \tag{50}$$

$$p_{L,R}^- \rightarrow n_{L,R}^- \tau_{L,R}^- \bar{\nu}_{\tau R,L}, \quad p_{R,L}^+ \rightarrow n_{R,L}^+ \tau_{R,L}^+ \nu_{\tau L,R} \tag{51}$$

take place at the formation of flavor symmetrical tauonic bosons (31) and

$$(\tau_R^+, \nu_{\tau L}), \quad (\tau_L^+, \nu_{\tau R}) \tag{52}$$

as the extremely fast weak lepton syntheses.

The connections (48) and (49) express one more highly important regularity that if an evrmionic antineutrino (neutrino) interacts with a neutron (antineutron), a force of atomic unification must constitute an antineutrino (neutrino) hydrogen (antihydrogen) atom (antiatom) corresponding to the conservation in nature of the summed baryon and lepton number. This atom (antiatom) can be called by the name of Al-Fargoniy, a medieval Central Asiatic scientist. We introduce in addition a symbol Fn_N^A ($\bar{F}n_N^A$) for its denotation, allowing us to write a grand antineutrino (neutrino) synthesis

$$\bar{\nu}_{\epsilon R,L} + n_{L,R}^- \rightarrow Fn_1^1, \quad \nu_{\epsilon L,R} + n_{R,L}^+ \rightarrow \bar{F}n_1^1. \tag{53}$$

At first sight, the structural conversions (48) and (49) relate the processes

$$Fn_1^1 \rightarrow \bar{H}_1^1, \quad \bar{F}n_1^1 \rightarrow H_1^1 \tag{54}$$

to weak emission. On the other hand, the explicit values of masses show that

$$m_l^E > m_{\nu_l}^E, \quad m_n^E > m_p^E, \tag{55}$$

$$m_l^W > m_{\nu_l}^W, \quad m_p^W > m_n^W, \tag{56}$$

and consequently, Fn_1^1 ($\bar{F}n_1^1$) cannot decay by means of weak interactions. However, its decay through the electric masses is not forbidden, since in

$$Fn_1^1 \to \bar{H}_1^1 + (\nu_{\epsilon L,R}, \bar{\nu}_{\epsilon R,L}), \quad \bar{F}n_1^1 \to H_1^1 + (\nu_{\epsilon L,R}, \bar{\nu}_{\epsilon R,L}) \tag{57}$$

appears a crucial part of Coulomb transitions

$$n_{L,R}^- \to p_{L,R}^- \epsilon_{R,L}^+ \nu_{\epsilon L,R}, \quad n_{R,L}^+ \to p_{R,L}^+ \epsilon_{L,R}^- \bar{\nu}_{\epsilon R,L} \tag{58}$$

constituting the flavor symmetrical neutrino difermions

$$(\nu_{\epsilon L}, \bar{\nu}_{\epsilon R}), \quad (\nu_{\epsilon R}, \bar{\nu}_{\epsilon L}). \tag{59}$$

An antineutrino hydrogen Fn_1^1 can therefore interact with not only H_1^1 but also its other isotopes

$$Fn_1^1 + H_1^1 \to H_1^2, \quad Fn_1^1 + H_1^2 \to H_1^3, \quad Fn_1^1 + H_1^3 \to H_1^4, \tag{60}$$

$$Fn_1^1 + H_1^4 \to H_1^5, \quad Fn_1^1 + H_1^5 \to H_1^6, \quad Fn_1^1 + H_1^6 \to H_1^7. \tag{61}$$

The order of orbits of these types of hydrogen atoms behaves as a quantized sequence

$$Fn_1^1 \to O_{\bar{\nu}_\epsilon} \to N_{\bar{\nu}_\epsilon}^o = 1 \to N_{\bar{\nu}_\epsilon} = 1,$$

$$H_1^1 \to O_\epsilon \to N_\epsilon^o = 1 \to N_\epsilon = 1,$$

$$H_1^2 \to O_{\epsilon\bar{\nu}_\epsilon} \to N_{\epsilon\bar{\nu}_\epsilon}^o = 1 \to N_{\epsilon\bar{\nu}_\epsilon} = 1,$$

$$H_1^3 \to O_{\bar{\nu}_\epsilon}, \quad O_{\epsilon\bar{\nu}_\epsilon} \to N_{\bar{\nu}_\epsilon}^o = 1, \quad N_{\epsilon\bar{\nu}_\epsilon}^o = 2 \to N_{\bar{\nu}_\epsilon} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,$$

$$H_1^4 \to O_{\bar{\nu}_\epsilon}^L, \quad O_{\bar{\nu}_\epsilon}^R, \quad O_{\epsilon\bar{\nu}_\epsilon} \to N_{\bar{\nu}_\epsilon}^o = 1,2, \quad N_{\epsilon\bar{\nu}_\epsilon}^o = 3 \to N_{\bar{\nu}_\epsilon} = 1,1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,$$

$$H_1^5 \to O_{\bar{\nu}_\epsilon}^L, \quad O_{\bar{\nu}_\epsilon}^R, \quad O_{\bar{\nu}_e}, \quad O_{\epsilon\bar{\nu}_\epsilon} \to N_{\bar{\nu}_\epsilon}^o = 1,2, \quad N_{\bar{\nu}_e}^o = 3,$$
$$N_{\epsilon\bar{\nu}_\epsilon}^o = 4 \to N_{\bar{\nu}_\epsilon} = 1,1, \quad N_{\bar{\nu}_e} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,$$

$$H_1^6 \to O_{\bar{\nu}_\epsilon}^L, \quad O_{\bar{\nu}_\epsilon}^R, \quad O_{\bar{\nu}_e}^L, \quad O_{\bar{\nu}_e}^R, \quad O_{\epsilon\bar{\nu}_\epsilon} \to N_{\bar{\nu}_\epsilon}^o = 1,2, \quad N_{\bar{\nu}_e}^o = 3,4,$$
$$N_{\epsilon\bar{\nu}_\epsilon}^o = 5 \to N_{\bar{\nu}_\epsilon} = 1,1, \quad N_{\bar{\nu}_e} = 1,1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,$$

$$H_1^7 \to O_{\bar{\nu}_\epsilon}^L, \quad O_{\bar{\nu}_\epsilon}^R, \quad O_{\bar{\nu}_e}^L, \quad O_{\bar{\nu}_e}^R, \quad O_{\bar{\nu}_\mu}, \quad O_{\epsilon\bar{\nu}_\epsilon} \to N_{\bar{\nu}_\epsilon}^o = 1,2, \quad N_{\bar{\nu}_e}^o = 3,4, \quad N_{\bar{\nu}_\mu}^o = 5,$$
$$N_{\epsilon\bar{\nu}_\epsilon}^o = 6 \to N_{\bar{\nu}_\epsilon} = 1,1, \quad N_{\bar{\nu}_e} = 1,1, \quad N_{\bar{\nu}_\mu} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1.$$

The appearance of an antineutrino orbit $O_{\bar{\nu}_e}$ in H_1^5 would seem to explain the possibility in neutrinos to constitute not only the paraneutrinos (59) but also the dineutrinos

$$(\nu_{\epsilon L}, \bar{\nu}_{eR}), \quad (\nu_{\epsilon R}, \bar{\nu}_{eL}). \tag{62}$$

At the same time, the emission of a neutrino string upon the interaction of Fn_1^1 ($\bar{F}n_1^1$) with H_1^4 ($\bar{H}_1^4$) can be explained by the successive decays originating in orbit of an evrmionic boson by the schemes

$$\epsilon_{L,R}^- \to e_{L,R}^- \bar{\nu}_{eR,L} \nu_{\epsilon L,R}, \quad \epsilon_{R,L}^+ \to e_{R,L}^+ \nu_{eL,R} \bar{\nu}_{\epsilon R,L}, \tag{63}$$

$$e_{L,R}^- \to \epsilon_{L,R}^- \bar{\nu}_{\epsilon R,L} \nu_{eL,R}, \quad e_{R,L}^+ \to \epsilon_{R,L}^+ \nu_{\epsilon L,R} \bar{\nu}_{eR,L}. \tag{64}$$

The first of them are the results of weak masses responsible for

$$\epsilon_{L,R}^- \to \mu_{L,R}^- \bar{\nu}_{\mu R,L} \nu_{\epsilon L,R}, \quad \epsilon_{R,L}^+ \to \mu_{R,L}^+ \nu_{\mu L,R} \bar{\nu}_{\epsilon R,L}, \tag{65}$$

$$\epsilon_{L,R}^- \to \tau_{L,R}^- \bar{\nu}_{\tau R,L} \nu_{\epsilon L,R}, \quad \epsilon_{R,L}^+ \to \tau_{R,L}^+ \nu_{\tau L,R} \bar{\nu}_{\epsilon R,L}. \tag{66}$$

The decays (64), similarly to each of transitions

$$\mu_{L,R}^- \to \epsilon_{L,R}^- \bar{\nu}_{\epsilon R,L} \nu_{\mu L,R}, \quad \mu_{R,L}^+ \to \epsilon_{R,L}^+ \nu_{\epsilon L,R} \bar{\nu}_{\mu R,L}, \tag{67}$$

$$\tau_{L,R}^- \to \epsilon_{L,R}^- \bar{\nu}_{\epsilon R,L} \nu_{\tau L,R}, \quad \tau_{R,L}^+ \to \epsilon_{R,L}^+ \nu_{\epsilon L,R} \bar{\nu}_{\tau R,L}, \tag{68}$$

must go at the expense of electric masses.

But, as stated in decays (63), the neutrino $\nu_{\epsilon L,R}$ and antineutrino $\bar{\nu}_{eR,L}$ at the level as were connected cannot exist in difermions (62) for a long time without restoration of the flavor symmetry of emission. They can thus individually pass [21] from the usual left (right)-handed space into a mirror right (left)-handed space by the schemes

$$\nu_{lL} \to \nu_{lR} + \overline{\gamma}_L, \quad \nu_{lR} \to \nu_{lL} + \gamma_R, \tag{69}$$

$$\bar{\nu}_{lR} \to \bar{\nu}_{lL} + \gamma_R, \quad \bar{\nu}_{lL} \to \bar{\nu}_{lR} + \overline{\gamma}_L. \tag{70}$$

This corresponds in transitions (61) to the fact that

$$Fn_1^1 + H_1^4 \to H_1^5 + (\nu_{\epsilon L,R}, \bar{\nu}_{\epsilon R,L}) + (\gamma_R, \overline{\gamma}_L) \tag{71}$$

is carried out in our space-time with the emission of a photon string, which relates [17] the two left (right)-handed photons in individual diphotons

$$(\gamma_L, \overline{\gamma}_R), \quad (\gamma_R, \overline{\gamma}_L), \tag{72}$$

confirming that a photobirth of neutrino pairs in atomic system can originate by the usual modes

$$\gamma_R \to \nu_{lR} + \bar{\nu}_{lR}, \quad \overline{\gamma}_L \to \nu_{lL} + \bar{\nu}_{lL}. \tag{73}$$

So it is seen that only those neutrinos, each of which arises from the decay of γ_R or $\overline{\gamma}_L$, can lead to the birth of the same type of gauge boson. If such a neutrino is of leptonic families, it requires one to elucidate the ideas of any photobirth (73) from the point of view of the legality of conservation of an angular momentum. For this, we must at first recall the earlier experiments [22-24] about neutrino helicity, the analysis of which says about the absence [25] in left (right)-handed fermions of atomic system of a kind of interaction with right (left)-handed photons due to the spontaneous mirror symmetry violation [21]. Instead they interact with all left (right)-handed gauge bosons.

In such a case, from the decays (65) and (66), we are led to a correspondence principle that an orbit quantized sequence appears in the force dependence of atomic unification. Therefore, the availability of $O_{\bar{\nu}_e}^L$ and $O_{\bar{\nu}_e}^R$ in H_1^6 confirms the existence of new types of hydrogen atoms formed in transitions

$$Fn_1^1 + H_1^7 \to H_1^8, \quad Fn_1^1 + H_1^8 \to H_1^9, \quad Fn_1^1 + H_1^9 \to H_1^{10}. \tag{74}$$

Their orbits have the following orders:

$$H_1^8 \to O_{\bar{\nu}_\epsilon}^L, \quad O_{\bar{\nu}_\epsilon}^R, \quad O_{\bar{\nu}_e}^L, \quad O_{\bar{\nu}_e}^R, \quad O_{\bar{\nu}_\mu}^L, \quad O_{\bar{\nu}_\mu}^R, \quad O_{\epsilon\bar{\nu}_\epsilon} \to N_{\bar{\nu}_\epsilon}^o = 1,2, \quad N_{\bar{\nu}_e}^o = 3,4,$$
$$N_{\bar{\nu}_\mu}^o = 5,6, \quad N_{\epsilon\bar{\nu}_\epsilon}^o = 7 \to N_{\bar{\nu}_\epsilon} = 1,1, \quad N_{\bar{\nu}_e} = 1,1, \quad N_{\bar{\nu}_\mu} = 1,1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,$$

$$H_1^9 \to O_{\bar{\nu}_\epsilon}^L, \quad O_{\bar{\nu}_\epsilon}^R, \quad O_{\bar{\nu}_e}^L, \quad O_{\bar{\nu}_e}^R, \quad O_{\bar{\nu}_\mu}^L, \quad O_{\bar{\nu}_\mu}^R, \quad O_{\bar{\nu}_\tau}, \quad O_{\epsilon\bar{\nu}_\epsilon} \to N_{\bar{\nu}_\epsilon}^o = 1,2,$$
$$N_{\bar{\nu}_e}^o = 3,4, \quad N_{\bar{\nu}_\mu}^o = 5,6, \quad N_{\bar{\nu}_\tau}^o = 7, \quad N_{\epsilon\bar{\nu}_\epsilon}^o = 8 \to N_{\bar{\nu}_\epsilon} = 1,1, \quad N_{\bar{\nu}_e} = 1,1,$$
$$N_{\bar{\nu}_\mu} = 1,1, \quad N_{\bar{\nu}_\tau} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,$$

$$H_1^{10} \to O_{\bar{\nu}_\epsilon}^L, \quad O_{\bar{\nu}_\epsilon}^R, \quad O_{\bar{\nu}_e}^L, \quad O_{\bar{\nu}_e}^R, \quad O_{\bar{\nu}_\mu}^L, \quad O_{\bar{\nu}_\mu}^R, \quad O_{\bar{\nu}_\tau}^L, \quad O_{\bar{\nu}_\tau}^R, \quad O_{\epsilon\bar{\nu}_\epsilon} \to N_{\bar{\nu}_\epsilon}^o = 1,2,$$
$$N_{\bar{\nu}_e}^o = 3,4, \quad N_{\bar{\nu}_\mu}^o = 5,6, \quad N_{\bar{\nu}_\tau}^o = 7,8, \quad N_{\epsilon\bar{\nu}_\epsilon}^o = 9 \to N_{\bar{\nu}_\epsilon} = 1,1,$$
$$N_{\bar{\nu}_e} = 1,1, \quad N_{\bar{\nu}_\mu} = 1,1, \quad N_{\bar{\nu}_\tau} = 1,1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1.$$

The compound structures of all hydrogen isotopes H_Z^A of mass number from 1 to 10 predict one more naturally united regularity that to any type of leptonic family corresponds two isotope forms $(N > Z)$ with antineutrino orbits in the same atom $(N = Z)$ with boson orbits.

However, in the case of an arbitrary atomic system X_Z^A, any of these isotopes can appear in latent united processes

$$Fn_1^1 + X_Z^A \to X_Z^{A+1} + ... \tag{75}$$

Insofar as the isotopes $(Z > N)$ with lepton orbits of the same atomic system $(N = Z)$ with boson orbits are concerned, they are the consequences of grand syntheses of nuclei

$$\bar{F}n_1^1 + X_Z^A \to X_Z^{A-1} + ... \tag{76}$$

To such processes apply the transitions

$$\bar{F}n_1^1 + He_2^4 \to He_2^3, \quad \bar{F}n_1^1 + He_2^3 \to He_2^2, \quad \bar{F}n_1^1 + F_9^{18} \to F_9^{17}, \tag{77}$$

the second of which constitutes a new isotope of helium.

It is not surprising therefore that if the structural conversions (60), (61), and (74) exist, then, for example, a neutrino antihydrogen $\bar{F}n_1^1$ can successively interact with each of H_1^{10}, ..., H_1^2 until H_1^2 is able to constitute H_1^1 by the photon string emission laws. Of course, the roles of Fn_1^1 and $\bar{F}n_1^1$ in syntheses (75) and (76) have remained hitherto latent, and all atomic interconversions of the form $X_Z^A \leftrightarrow X_Z^{A+1}$ were always accepted as the decays.

5. Latent dynamics of spontaneous emission from an atomic system

We see that a decay of $n_{L,R}^-(n_{R,L}^+)$ cannot carry out in transitions (57) by the schemes

$$n_{L,R}^- \to p_{L,R}^- e_{R,L}^+ \nu_{eL,R}, \quad n_{R,L}^+ \to p_{R,L}^+ e_{L,R}^- \bar{\nu}_{eR,L}, \tag{78}$$

although this is not forbidden by masses of a Coulomb nature. The absence of such decays in Al-Fargoniy atoms suggests that the flavor of an orbital neutrino comes forward in orbit as a criterion for a kind of mode of the neutron decay in a nucleus. In other words, a decay in the form of (78) exists only in nuclei with orbits containing neutrinos of an electronic family. Therefore, in conformity with the implications of the orbit quantization law, we must recognize that β decays of $\bar{F}n_2^2$ and $\bar{F}n_2^3$ can spontaneously originate without an evrmion or a neutrino in the same way

$$\bar{F}n_2^2 \to He_2^2 + (\nu_{\epsilon L,R}, \bar{\nu}_{\epsilon R,L}), \tag{79}$$

$$\bar{F}n_2^3 \to He_2^3 + (\nu_{\epsilon L,R}, \bar{\nu}_{\epsilon R,L}). \tag{80}$$

Coulomb masses responsible for the processes (58), (79), and (80) predict the birth of a well known α particle in a decay of $\bar{F}n_2^4$ by a scheme

$$\bar{F}n_2^4 \to He_2^4 + (\nu_{\epsilon L,R}, \bar{\nu}_{\epsilon R,L}). \tag{81}$$

In the presence of orbits with electronic neutrinos, Coulomb transitions (64) and (78) transform $\bar{F}n_2^5$ and $\bar{F}n_2^6$ into the following isotopes of helium:

$$\bar{F}n_2^5 \to He_2^5 + (\nu_{\epsilon L,R}, \bar{\nu}_{\epsilon R,L}) + (\nu_{eL,R}, \bar{\nu}_{eR,L}), \tag{82}$$

$$\bar{F}n_2^6 \to He_2^6 + (\nu_{\epsilon L,R}, \bar{\nu}_{\epsilon R,L}) + (\nu_{eL,R}, \bar{\nu}_{eR,L}). \tag{83}$$

With successive origination of intraatomic conversions (58), (65), (67), (69), and (70), the antihydrogens $\bar{F}n_2^7$ and $\bar{F}n_2^8$ undergo strong structural changes

$$\bar{F}n_2^7 \to He_2^7 + (\nu_{\mu L,R}, \bar{\nu}_{\mu R,L}) + (\nu_{\epsilon L,R}, \bar{\nu}_{\epsilon R,L}) + (\gamma_R, \overline{\gamma}_L), \tag{84}$$

$$\bar{F}n_2^8 \to He_2^8 + (\nu_{\mu L,R}, \bar{\nu}_{\mu R,L}) + (\nu_{\epsilon L,R}, \bar{\nu}_{\epsilon R,L}) + (\gamma_R, \overline{\gamma}_L). \tag{85}$$

An orbital analysis of atomic systems $\bar{F}n_2^9$ and $\bar{F}n_2^{10}$ shows that with successive decays (58), (66), and (68)-(70), they are reduced to other isotopes of helium

$$\bar{F}n_2^9 \to He_2^9 + (\nu_{\tau L,R}, \bar{\nu}_{\tau R,L}) + (\nu_{\epsilon L,R}, \bar{\nu}_{\epsilon R,L}) + (\gamma_R, \overline{\gamma}_L), \tag{86}$$

$$\bar{F}n_2^{10} \to He_2^{10} + (\nu_{\tau L,R}, \bar{\nu}_{\tau R,L}) + (\nu_{\epsilon L,R}, \bar{\nu}_{\epsilon R,L}) + (\gamma_R, \overline{\gamma}_L). \tag{87}$$

It was mentioned earlier that the helium He_2^4 possesses two boson orbits, the first of which in its isotope He_2^3 must be converted into a lepton orbit. All other isotopes of helium have orbits in the following order:

$$He_2^2 \to O_\epsilon^L, \quad O_\epsilon^R \to N_\epsilon^o = 1,2 \to N_\epsilon = 1,1,$$

$$He_2^5 \to O_{\bar{\nu}_\epsilon}, \quad O_{\epsilon\bar{\nu}_\epsilon}^L, \quad O_{\epsilon\bar{\nu}_\epsilon}^R \to N_{\bar{\nu}_\epsilon}^o = 1, \quad N_{\epsilon\bar{\nu}_\epsilon}^o = 2,3 \to N_{\bar{\nu}_\epsilon} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,1,$$

$$He_2^6 \to O_{\bar{\nu}_\epsilon}^L, \quad O_{\bar{\nu}_\epsilon}^R, \quad O_{\epsilon\bar{\nu}_\epsilon}^L, \quad O_{\epsilon\bar{\nu}_\epsilon}^R \to N_{\bar{\nu}_\epsilon}^o = 1,2, \quad N_{\epsilon\bar{\nu}_\epsilon}^o = 3,4 \to N_{\bar{\nu}_\epsilon} = 1,1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,1,$$

$$He_2^7 \to O_{\bar{\nu}_\epsilon}^L, \quad O_{\bar{\nu}_\epsilon}^R, \quad O_{\bar{\nu}_e}, \quad O_{\epsilon\bar{\nu}_\epsilon}^L, \quad O_{\epsilon\bar{\nu}_\epsilon}^R \to N_{\bar{\nu}_\epsilon}^o = 1,2, \quad N_{\bar{\nu}_e}^o = 3,$$
$$N_{\epsilon\bar{\nu}_\epsilon}^o = 4,5 \to N_{\bar{\nu}_\epsilon} = 1,1, \quad N_{\bar{\nu}_e} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,1,$$

$$He_2^8 \to O_{\bar{\nu}_\epsilon}^L, \quad O_{\bar{\nu}_\epsilon}^R, \quad O_{\bar{\nu}_e}^L, \quad O_{\bar{\nu}_e}^R, \quad O_{\epsilon\bar{\nu}_\epsilon}^L, \quad O_{\epsilon\bar{\nu}_\epsilon}^R \to N_{\bar{\nu}_\epsilon}^o = 1,2, \quad N_{\bar{\nu}_e}^o = 3,4,$$
$$N_{\epsilon\bar{\nu}_\epsilon}^o = 5,6 \to N_{\bar{\nu}_\epsilon} = 1,1, \quad N_{\bar{\nu}_e} = 1,1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1,1,$$

$$He_2^9 \to O_{\bar{\nu}_\epsilon}^L, \quad O_{\bar{\nu}_\epsilon}^R, \quad O_{\bar{\nu}_e}^L, \quad O_{\bar{\nu}_e}^R, \quad O_{\bar{\nu}_\mu}, \quad O_{\epsilon\bar{\nu}_\epsilon}^L, \quad O_{\epsilon\bar{\nu}_\epsilon}^R \to N_{\bar{\nu}_\epsilon}^o = 1,2, \quad N_{\bar{\nu}_e}^o = 3,4,$$

$$N^o_{\bar{\nu}_\mu} = 5, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 6, 7 \rightarrow N_{\bar{\nu}_\epsilon} = 1, 1, \quad N_{\bar{\nu}_e} = 1, 1, \quad N_{\bar{\nu}_\mu} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1, 1,$$

$$He^{10}_2 \rightarrow O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon} \rightarrow N^o_{\bar{\nu}_\epsilon} = 1, 2, \quad N^o_{\bar{\nu}_e} = 3, 4,$$

$$N^o_{\bar{\nu}_\mu} = 5, 6, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 7, 8 \rightarrow N_{\bar{\nu}_\epsilon} = 1, 1, \quad N_{\bar{\nu}_e} = 1, 1, \quad N_{\bar{\nu}_\mu} = 1, 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1, 1.$$

Comparing them, it is easy to observe one more highly important consequence of the orbit quantization law, which says about the existence in He^4_2 of the two heaviest isotopes:

$$Fn^1_1 + He^{10}_2 \rightarrow He^{11}_2, \quad Fn^1_1 + He^{11}_2 \rightarrow He^{12}_2. \tag{88}$$

The quantized sequence of the structural orbits comes forward in them as

$$He^{11}_2 \rightarrow O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon} \rightarrow N^o_{\bar{\nu}_\epsilon} = 1, 2,$$

$$N^o_{\bar{\nu}_e} = 3, 4, \quad N^o_{\bar{\nu}_\mu} = 5, 6, \quad N^o_{\bar{\nu}_\tau} = 7, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 8, 9 \rightarrow N_{\bar{\nu}_\epsilon} = 1, 1,$$

$$N_{\bar{\nu}_e} = 1, 1, \quad N_{\bar{\nu}_\mu} = 1, 1, \quad N_{\bar{\nu}_\tau} = 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1, 1,$$

$$He^{12}_2 \rightarrow O^L_{\bar{\nu}_\epsilon}, \quad O^R_{\bar{\nu}_\epsilon}, \quad O^L_{\bar{\nu}_e}, \quad O^R_{\bar{\nu}_e}, \quad O^L_{\bar{\nu}_\mu}, \quad O^R_{\bar{\nu}_\mu}, \quad O^L_{\bar{\nu}_\tau}, \quad O^R_{\bar{\nu}_\tau}, \quad O^L_{\epsilon\bar{\nu}_\epsilon}, \quad O^R_{\epsilon\bar{\nu}_\epsilon} \rightarrow N^o_{\bar{\nu}_\epsilon} = 1, 2,$$

$$N^o_{\bar{\nu}_e} = 3, 4, \quad N^o_{\bar{\nu}_\mu} = 5, 6, \quad N^o_{\bar{\nu}_\tau} = 7, 8, \quad N^o_{\epsilon\bar{\nu}_\epsilon} = 9, 10 \rightarrow N_{\bar{\nu}_\epsilon} = 1, 1,$$

$$N_{\bar{\nu}_e} = 1, 1, \quad N_{\bar{\nu}_\mu} = 1, 1, \quad N_{\bar{\nu}_\tau} = 1, 1, \quad N_{\epsilon\bar{\nu}_\epsilon} = 1, 1.$$

A feature of this picture is the principle that regardless of whether another family of leptons exists, the quantity of antineutrino orbits in an atom corresponding to the same flavor is equal to two.

Thus, if an orbital structure of atomic system is not quite consistent with the orbit quantization law, it reflects the availability of some so far unobserved latent isotopes in it.

Finally, insofar as the spontaneous γ emission from an atom is concerned, its dynamical origination is basically connected with β decay of a neutron or an antiproton, because in γ emission, antiparticles of intraatomic particles necessary for the formation of photons must appear. Examples include the transitions

$$H^2_1 \rightarrow 3\gamma_{L,R}, \quad H^3_1 \rightarrow 3\gamma_{L,R} + Fn^1_1 \tag{89}$$

as well as γ emissions from other atomic systems.

It remains the case, however, that nature is not forced to constitute any atomic system, around which would appear an absolute emptiness. In other words, we cannot find the same atoms regardless of the structure of medium in which they move. If, for example, any atomic system with string orbits interacts with an Al-Fargoniy neutrino antihydrogen antiatom, one of boson orbits of the latter, similarly to syntheses (76), will be transformed into a lepton orbit. This is carried out in nature in conformity with individual diphoton emission laws.

6. A unified spectral structure of atoms

The maximal quantity of all types of atomic orbits is equal to twice the same number of flavors. However, lepton orbits appear in an atom with boson orbits only if antiprotons of its nucleus are in excess. In contrast to this, antineutrino orbits must appear in a nucleus with orbital strings in the presence of excess neutrons. In both types of atoms, a spinless nucleus without isospin is necessarily present.

To express the idea more clearly, one must refer to the isotopes of hydrogen discussed above, because H_1^2 comes forward as the root of a hydrogen family of atomic systems. In a similar way, one can analyze the isotopes of helium. In this case, from our previous analyses, we find that He_2^4 must be accepted as the root of all helium isotopes. Thus, it constitutes the stem of a helium family of atoms.

Furthermore, if the interaction of an Al-Fargoniy neutrino antihydrogen atom with each of the available atomic systems with boson and antineutrino orbits is not forbidden by any conservation laws until its last antineutrino orbit is lost and all boson orbits are converted into lepton orbits, then the impression arises that nature itself characterizes each atom by a single root forming the stem of its family. Thereby, it emphasizes that whatever the atomic families the root of any atoms with boson and lepton orbits has undergone a fully latent interaction with an Al-Fargoniy antineutrino hydrogen atom. Under such circumstances, the set of atomic roots X_Z^{2Z} constitutes a latent united system of atoms.

Unification of this type suggests connections

$$Fn_2^2 + He_2^2 = He_2^4, \quad Fn_3^3 + Li_3^3 = Li_3^6, \tag{90}$$

$$Fn_4^4 + Be_4^4 = Be_4^8, \quad Fn_5^5 + B_5^5 = B_5^{10}, ... \tag{91}$$

and that, consequently, Fn_N^N plays the role of one of two atoms forming the root X_Z^{2Z} of the stem of each of the existing types of atomic families

$$Fn_N^N + X_Z^Z = X_Z^{2Z}. \tag{92}$$

Thus, we must recognize that in the arbitrary case of an atom X_Z^A, the numbers of isotopes I of its root X_Z^{2Z} of lepton (N_l^I) and antineutrino $(N_{\bar{\nu}_l}^I)$ orbits are equal to

$$N_l^I = Z, \quad N_{\bar{\nu}_l}^I = \begin{cases} 2L_l & \text{for} \quad Z = N = 1, \\ 2ZL_l & \text{for} \quad Z = N > 1. \end{cases} \tag{93}$$

Such a principle clearly shows that the total number N_{full}^I of isotopes that constitute the same atomic family is intimately connected with the quantity of lepton flavors

$$N_{full}^I = N_l^I + N_{\bar{\nu}_l}^I. \tag{94}$$

If we choose H_1^2 from the united system of atomic roots X_Z^{2Z}, its family consists of ten atoms. The helium family includes eighteen forms of atomic systems. Therefore, these families may be symbolically written as

$$H_1^2 \to N_l^I = 1, \quad N_{\bar{\nu}_l}^I = 8 \to N_{full}^I = 9 \to H_1^1, ..., H_1^{10},$$

$$He_2^4 \to N_l^I = 2, \quad N_{\bar{\nu}_l}^I = 16 \to N_{full}^I = 18 \to He_2^2, ..., He_2^{19}.$$

This united presentation in turn indicates the existence in nature of isotopes of helium, whose mass numbers lie in the range from 2 to 19 nucleons in a nucleus.

One can also find from Eqs. (90)-(94) that

$$Li_3^6 \to N_l^I = 3, \quad N_{\bar{\nu}_l}^I = 24 \to N_{full}^I = 27 \to Li_3^3, ..., Li_3^{28},$$

$$Be_4^8 \to N_l^I = 4, \quad N_{\bar{\nu}_l}^I = 32 \to N_{full}^I = 36 \to Be_4^4, ..., Be_4^{37},$$

$$B_5^{10} \to N_l^I = 5, \quad N_{\bar{\nu}_l}^I = 40 \to N_{full}^I = 45 \to B_5^5, ..., B_5^{46},$$

$$C_6^{12} \to N_l^I = 6, \quad N_{\bar{\nu}_l}^I = 48 \to N_{full}^I = 54 \to C_6^6, ..., C_6^{55},$$
$$N_7^{14} \to N_l^I = 7, \quad N_{\bar{\nu}_l}^I = 56 \to N_{full}^I = 63 \to N_7^7, ..., N_7^{64},$$
$$O_8^{16} \to N_l^I = 8, \quad N_{\bar{\nu}_l}^I = 64 \to N_{full}^I = 72 \to O_8^8, ..., O_8^{73},$$
$$F_9^{18} \to N_l^I = 9, \quad N_{\bar{\nu}_l}^I = 72 \to N_{full}^I = 81 \to F_9^9, ..., F_9^{82},$$
$$Ne_{10}^{20} \to N_l^I = 10, \quad N_{\bar{\nu}_l}^I = 80 \to N_{full}^I = 90 \to Ne_{10}^{10}, ..., Ne_{10}^{91},$$
$$Na_{11}^{22} \to N_l^I = 11, \quad N_{\bar{\nu}_l}^I = 88 \to N_{full}^I = 99 \to Na_{11}^{11}, ..., Na_{11}^{100},$$
$$Mg_{12}^{24} \to N_l^I = 12, \quad N_{\bar{\nu}_l}^I = 96 \to N_{full}^I = 108 \to Mg_{12}^{12}, ..., Mg_{12}^{109},$$
$$Al_{13}^{26} \to N_l^I = 13, \quad N_{\bar{\nu}_l}^I = 104 \to N_{full}^I = 117 \to Al_{13}^{13}, ..., Al_{13}^{118},$$
$$Si_{14}^{28} \to N_l^I = 14, \quad N_{\bar{\nu}_l}^I = 112 \to N_{full}^I = 126 \to Si_{14}^{14}, ..., Si_{14}^{127},$$
$$P_{15}^{30} \to N_l^I = 15, \quad N_{\bar{\nu}_l}^I = 120 \to N_{full}^I = 135 \to P_{15}^{15}, ..., P_{15}^{136},$$
$$S_{16}^{32} \to N_l^I = 16, \quad N_{\bar{\nu}_l}^I = 128 \to N_{full}^I = 144, \to S_{16}^{16}, ..., S_{16}^{145},$$
$$Cl_{17}^{34} \to N_l^I = 17, \quad N_{\bar{\nu}_l}^I = 136 \to N_{full}^I = 153 \to Cl_{17}^{17}, ..., Cl_{17}^{154},$$
$$Ar_{18}^{36} \to N_l^I = 18, \quad N_{\bar{\nu}_l}^I = 144 \to N_{full}^I = 162 \to Ar_{18}^{18}, ..., Ar_{18}^{163},$$
$$K_{19}^{38} \to N_l^I = 19, \quad N_{\bar{\nu}_l}^I = 152 \to N_{full}^I = 171 \to K_{19}^{19}, ..., K_{19}^{172},$$
$$Ca_{20}^{40} \to N_l^I = 20, \quad N_{\bar{\nu}_l}^I = 160 \to N_{full}^I = 180 \to Ca_{20}^{20}, ..., Ca_{20}^{181}.$$

The theory of atomic systems describing these families predicts that the quantities of isotopes arising from root atoms with atomic numbers from 21 to 57 are as follows:

$$Sc_{21}^{42} \to N_l^I = 21, \quad N_{\bar{\nu}_l}^I = 168 \to N_{full}^I = 189 \to Sc_{21}^{21}, ..., Sc_{21}^{190},$$
$$Ti_{22}^{44} \to N_l^I = 22, \quad N_{\bar{\nu}_l}^I = 176 \to N_{full}^I = 198 \to Ti_{22}^{22}, ..., Ti_{22}^{199},$$
$$V_{23}^{46} \to N_l^I = 23, \quad N_{\bar{\nu}_l}^I = 184 \to N_{full}^I = 207 \to V_{23}^{23}, ..., V_{23}^{208},$$
$$Cr_{24}^{48} \to N_l^I = 24, \quad N_{\bar{\nu}_l}^I = 192 \to N_{full}^I = 216 \to Cr_{24}^{24}, ..., Cr_{24}^{217},$$
$$Mn_{25}^{50} \to N_l^I = 25, \quad N_{\bar{\nu}_l}^I = 200 \to N_{full}^I = 225 \to Mn_{25}^{25}, ..., Mn_{25}^{226},$$
$$Fe_{26}^{52} \to N_l^I = 26, \quad N_{\bar{\nu}_l}^I = 208 \to N_{full}^I = 234 \to Fe_{26}^{26}, ..., Fe_{26}^{235},$$
$$Co_{27}^{54} \to N_l^I = 27, \quad N_{\bar{\nu}_l}^I = 216 \to N_{full}^I = 243 \to Co_{27}^{27}, ..., Co_{27}^{244},$$
$$Ni_{28}^{56} \to N_l^I = 28, \quad N_{\bar{\nu}_l}^I = 224 \to N_{full}^I = 252 \to Ni_{28}^{28}, ..., Ni_{28}^{253},$$
$$Cu_{29}^{58} \to N_l^I = 29, \quad N_{\bar{\nu}_l}^I = 232 \to N_{full}^I = 261 \to Cu_{29}^{29}, ..., Cu_{29}^{262},$$
$$Zn_{30}^{60} \to N_l^I = 30, \quad N_{\bar{\nu}_l}^I = 240 \to N_{full}^I = 270 \to Zn_{30}^{30}, ..., Zn_{30}^{271},$$
$$Ga_{31}^{62} \to N_l^I = 31, \quad N_{\bar{\nu}_l}^I = 248 \to N_{full}^I = 279 \to Ga_{31}^{31}, ..., Ga_{31}^{280},$$
$$Ge_{32}^{64} \to N_l^I = 32, \quad N_{\bar{\nu}_l}^I = 256 \to N_{full}^I = 288 \to Ge_{32}^{32}, ..., Ge_{32}^{289},$$
$$As_{33}^{66} \to N_l^I = 33, \quad N_{\bar{\nu}_l}^I = 264 \to N_{full}^I = 297 \to As_{33}^{33}, ..., As_{33}^{298},$$
$$Se_{34}^{68} \to N_l^I = 34, \quad N_{\bar{\nu}_l}^I = 272 \to N_{full}^I = 306 \to Se_{34}^{34}, ..., Se_{34}^{307},$$

$$Br_{35}^{70} \rightarrow N_l^I = 35, \quad N_{\bar{\nu}_l}^I = 280 \rightarrow N_{full}^I = 315 \rightarrow Br_{35}^{35}, ..., Br_{35}^{316},$$

$$Kr_{36}^{72} \rightarrow N_l^I = 36, \quad N_{\bar{\nu}_l}^I = 288 \rightarrow N_{full}^I = 324 \rightarrow Kr_{36}^{36}, ..., Kr_{36}^{325},$$

$$Rb_{37}^{74} \rightarrow N_l^I = 37, \quad N_{\bar{\nu}_l}^I = 296 \rightarrow N_{full}^I = 333 \rightarrow Rb_{37}^{37}, ..., Rb_{37}^{334},$$

$$Sr_{38}^{76} \rightarrow N_l^I = 38, \quad N_{\bar{\nu}_l}^I = 304 \rightarrow N_{full}^I = 342 \rightarrow Sr_{38}^{38}, ..., Sr_{38}^{343},$$

$$Y_{39}^{78} \rightarrow N_l^I = 39, \quad N_{\bar{\nu}_l}^I = 312 \rightarrow N_{full}^I = 351 \rightarrow Y_{39}^{39}, ..., Y_{39}^{352},$$

$$Zr_{40}^{80} \rightarrow N_l^I = 40, \quad N_{\bar{\nu}_l}^I = 320 \rightarrow N_{full}^I = 360 \rightarrow Zr_{40}^{40}, ..., Zr_{40}^{361},$$

$$Nb_{41}^{82} \rightarrow N_l^I = 41, \quad N_{\bar{\nu}_l}^I = 328 \rightarrow N_{full}^I = 369 \rightarrow Nb_{41}^{41}, ..., Nb_{41}^{370},$$

$$Mo_{42}^{84} \rightarrow N_l^I = 42, \quad N_{\bar{\nu}_l}^I = 336 \rightarrow N_{full}^I = 378 \rightarrow Mo_{42}^{42}, ..., Mo_{42}^{379},$$

$$Tc_{43}^{86} \rightarrow N_l^I = 43, \quad N_{\bar{\nu}_l}^I = 344 \rightarrow N_{full}^I = 387 \rightarrow Tc_{43}^{43}, ..., Tc_{43}^{388},$$

$$Ru_{44}^{88} \rightarrow N_l^I = 44, \quad N_{\bar{\nu}_l}^I = 352 \rightarrow N_{full}^I = 396 \rightarrow Ru_{44}^{44}, ..., Ru_{44}^{397},$$

$$Rh_{45}^{90} \rightarrow N_l^I = 45, \quad N_{\bar{\nu}_l}^I = 360 \rightarrow N_{full}^I = 405 \rightarrow Rh_{45}^{45}, ..., Rh_{45}^{406},$$

$$Pd_{46}^{92} \rightarrow N_l^I = 46, \quad N_{\bar{\nu}_l}^I = 368 \rightarrow N_{full}^I = 414 \rightarrow Pd_{46}^{46}, ..., Pd_{46}^{415},$$

$$Ag_{47}^{94} \rightarrow N_l^I = 47, \quad N_{\bar{\nu}_l}^I = 376 \rightarrow N_{full}^I = 423 \rightarrow Ag_{47}^{47}, ..., Ag_{47}^{424},$$

$$Cd_{48}^{96} \rightarrow N_l^I = 48, \quad N_{\bar{\nu}_l}^I = 384 \rightarrow N_{full}^I = 432 \rightarrow Cd_{48}^{48}, ..., Cd_{48}^{433},$$

$$In_{49}^{98} \rightarrow N_l^I = 49, \quad N_{\bar{\nu}_l}^I = 392 \rightarrow N_{full}^I = 441 \rightarrow In_{49}^{49}, ..., In_{49}^{442},$$

$$Sn_{50}^{100} \rightarrow N_l^I = 50, \quad N_{\bar{\nu}_l}^I = 400 \rightarrow N_{full}^I = 450 \rightarrow Sn_{50}^{50}, ..., Sn_{50}^{451},$$

$$Sb_{51}^{102} \rightarrow N_l^I = 51, \quad N_{\bar{\nu}_l}^I = 408 \rightarrow N_{full}^I = 459 \rightarrow Sb_{51}^{51}, ..., Sb_{51}^{460},$$

$$Te_{52}^{104} \rightarrow N_l^I = 52, \quad N_{\bar{\nu}_l}^I = 416 \rightarrow N_{full}^I = 468 \rightarrow Te_{52}^{52}, ..., Te_{52}^{469},$$

$$I_{53}^{106} \rightarrow N_l^I = 53, \quad N_{\bar{\nu}_l}^I = 424 \rightarrow N_{full}^I = 477 \rightarrow I_{53}^{53}, ..., I_{53}^{478},$$

$$Xe_{54}^{108} \rightarrow N_l^I = 54, \quad N_{\bar{\nu}_l}^I = 432 \rightarrow N_{full}^I = 486 \rightarrow Xe_{54}^{54}, ..., Xe_{54}^{487},$$

$$Cs_{55}^{110} \rightarrow N_l^I = 55, \quad N_{\bar{\nu}_l}^I = 440 \rightarrow N_{full}^I = 495 \rightarrow Cs_{55}^{55}, ..., Cs_{55}^{496},$$

$$Ba_{56}^{112} \rightarrow N_l^I = 56, \quad N_{\bar{\nu}_l}^I = 448 \rightarrow N_{full}^I = 504 \rightarrow Ba_{56}^{56}, ..., Ba_{56}^{505},$$

$$La_{57}^{114} \rightarrow N_l^I = 57, \quad N_{\bar{\nu}_l}^I = 456 \rightarrow N_{full}^I = 513 \rightarrow La_{57}^{57}, ..., La_{57}^{514}.$$

The mechanism responsible for this order defines the family structures corresponding to atomic roots with mass numbers from 116 to 142 in the form

$$Ce_{58}^{116} \rightarrow N_l^I = 58, \quad N_{\bar{\nu}_l}^I = 464 \rightarrow N_{full}^I = 522 \rightarrow Ce_{58}^{58}, ..., Ce_{58}^{523},$$

$$Pr_{59}^{118} \rightarrow N_l^I = 59, \quad N_{\bar{\nu}_l}^I = 472 \rightarrow N_{full}^I = 531 \rightarrow Pr_{59}^{59}, ..., Pr_{59}^{532},$$

$$Nd_{60}^{120} \rightarrow N_l^I = 60, \quad N_{\bar{\nu}_l}^I = 480 \rightarrow N_{full}^I = 540 \rightarrow Nd_{60}^{60}, ..., Nd_{60}^{541},$$

$$Pm_{61}^{122} \rightarrow N_l^I = 61, \quad N_{\bar{\nu}_l}^I = 488 \rightarrow N_{full}^I = 549 \rightarrow Pm_{61}^{61}, ..., Pm_{61}^{550},$$

$$Sm_{62}^{124} \rightarrow N_l^I = 62, \quad N_{\bar{\nu}_l}^I = 496 \rightarrow N_{full}^I = 558 \rightarrow Sm_{62}^{62}, ..., Sm_{62}^{559},$$

$$Eu_{63}^{126} \rightarrow N_l^I = 63, \quad N_{\bar{\nu}_l}^I = 504 \rightarrow N_{full}^I = 567 \rightarrow Eu_{63}^{63}, ..., Eu_{63}^{568},$$

$$Gd_{64}^{128} \to N_l^I = 64, \quad N_{\bar{\nu}_l}^I = 512 \to N_{full}^I = 576 \to Gd_{64}^{64}, ..., Gd_{64}^{577},$$

$$Tb_{65}^{130} \to N_l^I = 65, \quad N_{\bar{\nu}_l}^I = 520 \to N_{full}^I = 585 \to Tb_{65}^{65}, ..., Tb_{65}^{586},$$

$$Dy_{66}^{132} \to N_l^I = 66, \quad N_{\bar{\nu}_l}^I = 528 \to N_{full}^I = 594 \to Dy_{66}^{66}, ..., Dy_{66}^{595},$$

$$Ho_{67}^{134} \to N_l^I = 67, \quad N_{\bar{\nu}_l}^I = 536 \to N_{full}^I = 603 \to Ho_{67}^{67}, ..., Ho_{67}^{604},$$

$$Er_{68}^{136} \to N_l^I = 68, \quad N_{\bar{\nu}_l}^I = 544 \to N_{full}^I = 612 \to Er_{68}^{68}, ..., Er_{68}^{613},$$

$$Tu_{69}^{138} \to N_l^I = 69, \quad N_{\bar{\nu}_l}^I = 552 \to N_{full}^I = 621 \to Tu_{69}^{69}, ..., Tu_{69}^{622},$$

$$Yb_{70}^{140} \to N_l^I = 70, \quad N_{\bar{\nu}_l}^I = 560 \to N_{full}^I = 630 \to Yb_{70}^{70}, ..., Yb_{70}^{631},$$

$$Lu_{71}^{142} \to N_l^I = 71, \quad N_{\bar{\nu}_l}^I = 568 \to N_{full}^I = 639 \to Lu_{71}^{71}, ..., Lu_{71}^{640}.$$

Such a structural sequence takes place even with atomic unification

$$Hf_{72}^{144} \to N_l^I = 72, \quad N_{\bar{\nu}_l}^I = 576 \to N_{full}^I = 648 \to Hf_{72}^{72}, ..., Hf_{72}^{649},$$

$$Tu_{73}^{146} \to N_l^I = 73, \quad N_{\bar{\nu}_l}^I = 584 \to N_{full}^I = 657 \to Tu_{73}^{73}, ..., Tu_{73}^{658},$$

$$W_{74}^{148} \to N_l^I = 74, \quad N_{\bar{\nu}_l}^I = 592 \to N_{full}^I = 666 \to W_{74}^{74}, ..., W_{74}^{667},$$

$$Re_{75}^{150} \to N_l^I = 75, \quad N_{\bar{\nu}_l}^I = 600 \to N_{full}^I = 675 \to Re_{75}^{75}, ..., Re_{75}^{676},$$

$$Os_{76}^{152} \to N_l^I = 76, \quad N_{\bar{\nu}_l}^I = 608 \to N_{full}^I = 684 \to Os_{76}^{76}, ..., Os_{76}^{685},$$

$$Ir_{77}^{154} \to N_l^I = 77, \quad N_{\bar{\nu}_l}^I = 616 \to N_{full}^I = 693 \to Ir_{77}^{77}, ..., Ir_{77}^{694},$$

$$Pt_{78}^{156} \to N_l^I = 78, \quad N_{\bar{\nu}_l}^I = 624 \to N_{full}^I = 702 \to Pt_{78}^{78}, ..., Pt_{78}^{703},$$

$$Au_{79}^{158} \to N_l^I = 79, \quad N_{\bar{\nu}_l}^I = 632 \to N_{full}^I = 711 \to Au_{79}^{79}, ..., Au_{79}^{712},$$

$$Hg_{80}^{160} \to N_l^I = 80, \quad N_{\bar{\nu}_l}^I = 640 \to N_{full}^I = 720 \to Hg_{80}^{80}, ..., Hg_{80}^{721},$$

$$Tl_{81}^{162} \to N_l^I = 81, \quad N_{\bar{\nu}_l}^I = 648 \to N_{full}^I = 729 \to Tl_{81}^{81}, ..., Tl_{81}^{730},$$

$$Pb_{82}^{164} \to N_l^I = 82, \quad N_{\bar{\nu}_l}^I = 656 \to N_{full}^I = 738 \to Pb_{82}^{82}, ..., Pb_{82}^{739},$$

$$Bi_{83}^{166} \to N_l^I = 83, \quad N_{\bar{\nu}_l}^I = 664 \to N_{full}^I = 747 \to Bi_{83}^{83}, ..., Bi_{83}^{748},$$

$$Po_{84}^{168} \to N_l^I = 84, \quad N_{\bar{\nu}_l}^I = 672 \to N_{full}^I = 756 \to Po_{84}^{84}, ..., Po_{84}^{757},$$

$$At_{85}^{170} \to N_l^I = 85, \quad N_{\bar{\nu}_l}^I = 680 \to N_{full}^I = 765 \to At_{85}^{85}, ..., At_{85}^{766},$$

$$Rn_{86}^{172} \to N_l^I = 86, \quad N_{\bar{\nu}_l}^I = 688 \to N_{full}^I = 774 \to Rn_{86}^{86}, ..., Rn_{86}^{775},$$

$$Fr_{87}^{174} \to N_l^I = 87, \quad N_{\bar{\nu}_l}^I = 696 \to N_{full}^I = 783 \to Fr_{87}^{87}, ..., Fr_{87}^{784},$$

$$Ra_{88}^{176} \to N_l^I = 88, \quad N_{\bar{\nu}_l}^I = 704 \to N_{full}^I = 792 \to Ra_{88}^{88}, ..., Ra_{88}^{793},$$

$$Ac_{89}^{178} \to N_l^I = 89, \quad N_{\bar{\nu}_l}^I = 712 \to N_{full}^I = 801 \to Ac_{89}^{89}, ..., Ac_{89}^{802}.$$

For completeness, it is necessary to also present the quantities of isotopes of the heaviest atomic roots

$$Th_{90}^{180} \to N_l^I = 90, \quad N_{\bar{\nu}_l}^I = 720 \to N_{full}^I = 810 \to Th_{90}^{90}, ..., Th_{90}^{811},$$

$$Pa_{91}^{182} \to N_l^I = 91, \quad N_{\bar{\nu}_l}^I = 728 \to N_{full}^I = 819 \to Pa_{91}^{91}, ..., Pa_{91}^{820},$$

$$U_{92}^{184} \rightarrow N_l^I = 92, \quad N_{\bar{\nu}_l}^I = 736 \rightarrow N_{full}^I = 828 \rightarrow U_{92}^{92}, ..., U_{92}^{829},$$
$$Np_{93}^{186} \rightarrow N_l^I = 93, \quad N_{\bar{\nu}_l}^I = 744 \rightarrow N_{full}^I = 837 \rightarrow Np_{93}^{93}, ..., Np_{93}^{838},$$
$$Pu_{94}^{188} \rightarrow N_l^I = 94, \quad N_{\bar{\nu}_l}^I = 752 \rightarrow N_{full}^I = 846 \rightarrow Pu_{94}^{94}, ..., Pu_{94}^{847},$$
$$Am_{95}^{190} \rightarrow N_l^I = 95, \quad N_{\bar{\nu}_l}^I = 760 \rightarrow N_{full}^I = 855 \rightarrow Am_{95}^{95}, ..., Am_{95}^{856},$$
$$Cm_{96}^{192} \rightarrow N_l^I = 96, \quad N_{\bar{\nu}_l}^I = 768 \rightarrow N_{full}^I = 864 \rightarrow Cm_{96}^{96}, ..., Cm_{96}^{865},$$
$$Bk_{97}^{194} \rightarrow N_l^I = 97, \quad N_{\bar{\nu}_l}^I = 776 \rightarrow N_{full}^I = 873 \rightarrow Bk_{97}^{97}, ..., Bk_{97}^{874},$$
$$Cf_{98}^{196} \rightarrow N_l^I = 98, \quad N_{\bar{\nu}_l}^I = 784 \rightarrow N_{full}^I = 882 \rightarrow Cf_{98}^{98}, ..., Cf_{98}^{883},$$
$$Es_{99}^{198} \rightarrow N_l^I = 99, \quad N_{\bar{\nu}_l}^I = 792 \rightarrow N_{full}^I = 891 \rightarrow Es_{99}^{99}, ..., Es_{99}^{892},$$
$$Fm_{100}^{200} \rightarrow N_l^I = 100, \quad N_{\bar{\nu}_l}^I = 800 \rightarrow N_{full}^I = 900 \rightarrow Fm_{100}^{100}, ..., Fm_{100}^{901},$$
$$Md_{101}^{202} \rightarrow N_l^I = 101, \quad N_{\bar{\nu}_l}^I = 808 \rightarrow N_{full}^I = 909 \rightarrow Md_{101}^{101}, ..., Md_{101}^{910},$$
$$No_{102}^{204} \rightarrow N_l^I = 102, \quad N_{\bar{\nu}_l}^I = 816 \rightarrow N_{full}^I = 918 \rightarrow No_{102}^{102}, ..., No_{102}^{919},$$
$$Lr_{103}^{206} \rightarrow N_l^I = 103, \quad N_{\bar{\nu}_l}^I = 824 \rightarrow N_{full}^I = 927 \rightarrow Lr_{103}^{103}, ..., Lr_{103}^{928}.$$

It is seen that the sequence of total numbers of isotopes

$$9, \quad 18, \quad 27, \quad ..., \quad 927, \quad ... \tag{95}$$

constitutes an arithmetic progression in a system of root atoms that corresponds to a kind of quantized sequence of atomic numbers

$$1, \quad 2, \quad 3, ..., \quad 103, \quad .... \tag{96}$$

Of course, the sum of the first 103 terms does not exclude, in the case of the progression (95), the availability in nature of 48204 isotope forms of 103 types of atoms. However, of them, only 3000 atomic forms are of the set of the discovered isotope structures [26,27].

7. Atoms in external fields

There exists a range of the structural connections in which appears a part of a unified family structure of atoms. A clear example is the uncovering by Stark [5] of the splitting of the spectral lines of hydrogen and helium in an electric field.

To solve the question of why an electric field splits each spectral line of atomic system into a range of other lines, between which there exists a regular sequence, one must refer to the quanta of this field, namely, the photons of an electric nature, because they act on its structure. However, unlike the earlier known features of gauge bosons, the influence of their field on an atom is carried out, in Stark's experience, as an indication in favor of a hard connection between an atomic system and a photon medium.

At the same time, the interratio of these two forms of objects corresponds in the field of emission to the coexistence of photobirths of both the neutrino and the neutron pairs. Therefore, from its point of view, it should be expected that each photosplitting of

$$\gamma_R \rightarrow \nu_{\epsilon R} + \bar{\nu}_{\epsilon R}, \quad \overline{\gamma}_L \rightarrow \nu_{\epsilon L} + \bar{\nu}_{\epsilon L} \tag{97}$$

says about the dynamical origination in another place of the same electric field of a kind of photosplitting of

$$\gamma_R \to n_R^- + n_R^+, \quad \overline{\gamma}_L \to n_L^- + n_L^+. \tag{98}$$

These transitions, together with summed baryon and lepton number conservation, transform the photon field into an atomic field. Its quanta Fn_1^1 and $\bar{F}n_1^1$, namely, the Al-Fargoniy hydrogen and antihydrogen have important consequences for the unification of atoms.

The set of transitions

$$Fn_1^1 + X_Z^{2Z} \to X_Z^{2Z+1}, \tag{99}$$

$$\bar{F}n_1^1 + X_Z^{Z+1} \to X_Z^Z \tag{100}$$

originating in an atomic field constitutes an isotopic family of the investigated atom that was identified by Stark as a splitting of its spectral lines.

Insofar as the completeness of the observed picture is concerned, it can appear in the power dependence of devices used for observation. However, the density of the lines, as established in Stark's experience [5], undergoes a structural change at the replacement of hydrogen by helium. This fact explains why the interactions (92), (99), and (100) confirm the existence of a unified spectral structure of atoms.

The splitting of the spectral lines of atomic system is also observed in an external magnetic field. But, as was discovered by Zeeman [6] for the first time, this splitting is not a usual intraatomic transition.

At first sight, a magnetic field acts on atoms through the same mechanism that is responsible for the influence of an electric field on their structure. This, however, would take place only in the case of the fundamental symmetry between electricity and magnetism being wholly absent. Therefore, without violate of the structural regularities of electromagnetic matter fields, we accept that each particle of electric mass and charge says in favor [28] of a kind of monoparticle with magnetic mass and charge. In this situation, any monophoton may serve as one of the quanta of a magnetic field.

A unity of symmetry laws of elementary monoparticles splits one monophoton state into a mononeutrino pair. Another monophoton state of the same magnetic field is split into a mononeutron pair. Thus, the monophoton field is transformed into a monoatomic field so that its monoquanta Fn_1^1 and $\bar{F}n_1^1$, namely, the Al-Fargoniy monohydrogen and antimonohydrogen relate one pair of mononeutrinos to another pair of mononeutrons as a consequence of a grand synthesis of mononuclei.

If an atom now interacts with a magnetic field, it can be converted at first into a monoatom and, next, the latter at the new level encounters quanta of this field.

In these circumstances, the set of collisions carrying out in a monoatomic field constitutes a monoisotopic family that was identified by Zeeman as a splitting of the spectral lines of an atom in a magnetic field.

From these remarks, it is clear that the difference in lifetimes of isotopes comes forward in both experiences as a criterion for completeness of a spectral picture.

8. Orbital mass, charge, and completeness of the quantum nature of atoms

Turning again to Eq. (7), we remark that the atomic system requires one to follow the logic, at the quantum mechanical level, of each component of this naturally united force from the point of view of the interacting objects of an intraatomic behavior. It chooses herewith the sizes of Newton and Coulomb forces between the nucleus and its satellite so that in a latent united form, their explicit values will be equal to

$$F_{N_{sl}} = G_N \frac{m_s m_l}{r_{ls}^2}, \quad F_{C_{sl}} = \frac{1}{4\pi\epsilon_0} \frac{e_s e_l}{r_{ls}^2}. \tag{101}$$

Here $l = \epsilon$, e, μ, τ or ν_ϵ, ν_e, ν_μ, ν_τ, ..., whereas s denotes the atomic nucleus.

If we use the Planck mass and charge

$$m_{pl} = \left(\frac{\hbar c}{G_N}\right)^{1/2}, \quad e_{pl} = (4\pi\epsilon_0 \hbar c)^{1/2}, \tag{102}$$

with which Eqs. (101) are reduced to

$$F_{N_{sl}} = \frac{\hbar c}{m_{pl}^2} \frac{m_s m_l}{r_{ls}^2}, \quad F_{C_{sl}} = \frac{\hbar c}{e_{pl}^2} \frac{e_s e_l}{r_{ls}^2}, \tag{103}$$

then, for $F_{C_{sl}} > F_{N_{sl}}$, when

$$c_m^{sl} = \frac{F_{C_{sl}}}{F_{N_{sl}}} \tag{104}$$

is the relation among the parameters

$$c_m^{sl} = \frac{m_{pl}^2}{m_s m_l} \frac{e_s e_l}{e_{pl}^2} \tag{105}$$

in latent classical dynamics, one can relate, on the disclosed quantum basis, the intraatomic forces

$$F_{N_{sl}} = \frac{\hbar c}{m_{pl}^2} \left(\frac{m_{sl}^o}{r_{ls}}\right)^2, \quad F_{C_{sl}} = \frac{\hbar c}{e_{pl}^2} \left(\frac{e_{sl}^o}{r_{ls}}\right)^2 \tag{106}$$

and the relation

$$c_m^{sl} = \left(\frac{m_{pl}}{m_{sl}^o}\right)^2 \left(\frac{e_{sl}^o}{e_{pl}}\right)^2 \tag{107}$$

to the orbital mass and charge

$$m_{sl}^o = (b_m^{sl} m_s m_l)^{1/2}, \quad e_{sl}^o = (b_{ch}^{sl} e_s e_l)^{1/2}. \tag{108}$$

The availability of the dimensionless multipliers b_m^{sl} and b_{ch}^{sl} in them implies the existence in a system of any m_{sl}^o and e_{sl}^o at the quantum mechanical level. They define the speed v_{ls}, radius r_{ls}, full orbital energy E_{ls}, and thus directly the period T_{ls} of the revolution of a particle l around the nucleus s in the mass-charge structure [25] dependence of the united gauge invariance [3] of an intraatomic unified force.

Therefore, if the interaction between l and s is carried out in atoms as a consequence of Newton forces, the legality of conservation of an angular momentum for atomic orbits quantized by leptonic flavors follows from the fact that

$$b_{mn}^{sl} m_l v_{ls}^N r_{ls}^N = k_{sl}^N \hbar, \tag{109}$$

where b_{mn}^{sl} characterizes the orbital mass responsible for the construction of an atom in the presence of a force of gravity of the Newton, and k_{sl}^N describes the quantized sequence of its orbits of radii r_{ls}^N and with speeds v_{ls}^N of their particles.

To investigate further, one must follow the logic of Kepler's third law, because it expresses in whole the idea about that

$$\frac{(r_{ls}^N)^2}{T_{ls}^N}\frac{r_{ls}^N}{T_{ls}^N} = \frac{G_N m_s}{4\pi^2}. \tag{110}$$

Unification of Eq. (110) with the relation

$$\frac{(r_{ls}^N)^2}{T_{ls}^N} = \frac{k_{sl}^N \hbar}{2\pi b_{mn}^{sl} m_l} \tag{111}$$

implied from Eq. (109) and

$$T_{ls}^N = \frac{2\pi r_{ls}^N}{v_{ls}^N} \tag{112}$$

suggests a connection

$$\frac{r_{ls}^N}{T_{ls}^N} = G_N \frac{b_{mn}^{sl} m_s m_l}{2\pi k_{sl}^N \hbar}, \tag{113}$$

and consequently, the insertion of Eq. (113) in

$$\frac{r_{ls}^N}{T_{ls}^N} = \frac{v_{ls}^N}{2\pi} \tag{114}$$

using Eqs. (102), (108), and (109) allows one to conclude that

$$v_{ls}^N = \frac{1}{k_{sl}^N}\left(\frac{m_{sl}^o}{m_{pl}}\right)^2 c, \tag{115}$$

$$r_{ls}^N = (k_{sl}^N)^2 \left(\frac{m_{pl}}{m_{sl}^o}\right)^2 \frac{\hbar}{b_{mn}^{sl} m_l c}. \tag{116}$$

Insofar as the full orbital energy is concerned, it consists of kinetic and potential parts corresponding in nature to the most diverse properties of the same particle. But unlike the classical presentations about orbital motions, the discussed theory of the atomic structure relates the Newton energy E_{ls}^N to the mass m_{sl}^o and radius r_{ls}^N, confirming that

$$E_{ls}^N = -\frac{1}{2}\left(\frac{m_{sl}^o}{m_{pl}}\right)^2 \frac{\hbar c}{r_{ls}^N}. \tag{117}$$

In this definition, an important circumstance is the united connection

$$E_{ls}^N = \frac{1}{2} b_{mn}^{sl} m_l (v_{ls}^N)^2 - G_N \frac{b_{mn}^{sl} m_s m_l}{r_{ls}^N} \tag{118}$$

in which

$$(v_{ls}^N)^2 r_{ls}^N = G_N m_s. \tag{119}$$

There exists, however, the possibility that in the presence of a Coulomb force between l and s, the quantized sequence k_{sl}^C of atomic orbits of radii r_{ls}^C and with speeds v_{ls}^C of their particles is responsible for the conservation of an angular momentum

$$b_{mc}^{sl} m_l v_{ls}^C r_{ls}^C = k_{sl}^C \hbar \tag{120}$$

including the dimensionless size b^{sl}_{mc} of an orbital mass arising from the Coulomb construction. Thus, on a quantum mechanical basis, this formulation predicts another disclosed equation

$$b^{sl}_{mc}\frac{m_l(v^C_{ls})^2}{r^C_{ls}} - \frac{1}{4\pi\epsilon_0}\frac{b^{sl}_{ch}e_s e_l}{(r^C_{ls})^2} = 0. \tag{121}$$

Uniting Eq. (121) with Eq. (120) having in mind Eqs. (102) and (108), one can find that

$$v^C_{ls} = \frac{1}{k^C_{sl}}\left(\frac{e^o_{sl}}{e_{pl}}\right)^2 c, \tag{122}$$

$$r^C_{ls} = (k^C_{sl})^2\left(\frac{e_{pl}}{e^o_{sl}}\right)^2 \frac{\hbar}{b^{sl}_{mc}m_l c}. \tag{123}$$

Simultaneously, as is easy to see, the Coulomb orbital energy is equal to

$$E^C_{ls} = -\frac{1}{2}\left(\frac{e^o_{sl}}{e_{pl}}\right)^2 \frac{\hbar c}{r^C_{ls}} \tag{124}$$

as a consequence of unification of Eqs. (102), (108), and (121) with

$$E^C_{ls} = \frac{1}{2}b^{sl}_{mc}m_l(v^C_{ls})^2 - \frac{1}{4\pi\epsilon_0}\frac{b^{sl}_{ch}e_s e_l}{r^C_{ls}} \tag{125}$$

that unites its kinetic and potential components.

However, to build the functions v_{ls}, r_{ls}, T_{ls}, and E_{ls}, one must establish a true picture of the structural sizes b^{sl}_m, b^{sl}_{ch}, and k_{sl} by the intraatomic symmetry laws studying, on its basis, an interratio of each pair of the corresponding types of atomic systems.

9. Atoms with nuclei consisting of neutrons or antiprotons

Between the atomic systems Fn^N_N ($\bar{F}n^N_N$) and $\bar{X}^Z_Z$ (X^Z_Z), there exist connections due to which, in the Newton case, for a single neutron (antineutron) and antiproton (proton), from Eqs. (115), (116), and (119), we are led to the following interrelationship between the orbital masses of the two types of atoms with antineutrino (neutrino) and lepton (antilepton) orbits:

$$\left(\frac{m^o_{n\bar{\nu}_l}}{m_{pl}}\right)^2 \frac{m_p}{b^{n\bar{\nu}_l}_{mn}m_{\bar{\nu}_l}} = \left(\frac{m^o_{pl}}{m_{pl}}\right)^2 \frac{m_n}{b^{pl}_{mn}m_l}. \tag{126}$$

Here $m^o_{n\bar{\nu}_l}$ (m^o_{pl}) implies the orbital mass of atomic system in which antiprotons (neutrons) are absent from the nucleus, and $b^{n\bar{\nu}_l}_{mn}$ (b^{pl}_{mn}) denotes the dimensionless size of this mass.

To establish their explicit form, we must formulate and prove the first theorem of atomic unification.

Theorem 1. If the two functions with some individual variables correspond in a system to each of its flavor and baryon symmetry laws, they are in it the solutions of the same united equation in these two forms of unknowns.

Proof of the theorem 1. At first sight, Eq. (126) does not, by itself, define the structure of the orbital masses of atoms of both types. Nevertheless, the functions $(m^o_{n\bar{\nu}_l}/m_{pl})^2$ and $(m^o_{pl}/m_{pl})^2$ are, according to the theorem 1, connected with some individual variables. Such variables include, for example, the structural sizes, for which the flavor symmetry of Eq. (126) establishes an equality following from its baryon symmetry. We can, therefore, conclude that

$$\left(\frac{m^o_{n\bar{\nu}_l}}{m_{pl}}\right)^2 = \frac{m_p}{b^{n\bar{\nu}_l}_{mn} m_{\bar{\nu}_l}}, \quad b^{n\bar{\nu}_l}_{mn} = \frac{m_{pl}}{m_{\bar{\nu}_l}}\sqrt{\frac{m_p}{m_n}}, \tag{127}$$

$$\left(\frac{m^o_{pl}}{m_{pl}}\right)^2 = \frac{m_n}{b^{pl}_{mn} m_l}, \quad b^{pl}_{mn} = \frac{m_{pl}}{m_l}\sqrt{\frac{m_n}{m_p}}. \tag{128}$$

In their presence, the baryon symmetry of Eq. (126) states that

$$m_n m_p = m_n m_p \tag{129}$$

in which appears the validity of the theorem 1.

Inserting Eqs. (127) and (128) in Eq. (115) at $s = p$ (n) and $l = l$ $(\bar{\nu}_l)$, taking into account that $v^N_{\bar{\nu}_l n} \neq v^N_{lp}$, we are led to the fact that

$$\frac{1}{k^N_{n\bar{\nu}_l}} \frac{m_p}{b^{n\bar{\nu}_l}_{mn} m_{\bar{\nu}_l}} \neq \frac{1}{k^N_{pl}} \frac{m_n}{b^{pl}_{mn} m_l}. \tag{130}$$

For further substantiation of its legality, we formulate and prove here the second theorem of atomic unification.

Theorem 2. If the two equalities with some own variables correspond in a system to each of its flavor and baryon symmetry laws, they are in it the solutions of the same united inequality in these two forms of unknowns.

Proof of the theorem 2. From the point of view of each atomic system of $n\bar{\nu}_l$ and pl, the inequality (130) must have both a flavor and a baryon symmetry. For their conservation, $(1/k^N_{n\bar{\nu}_l})$ and $(1/k^N_{pl})$ should, on the basis of the theorem 2, be chosen so that the baryon symmetry constitutes, in the case of the unidenticality (130), an inequality implied from its flavor symmetry. Such connections describe a situation in which the two equalities become solutions of the same inequality, analogous to the fact that the equality (110) expressing the idea of Kepler's third law [29-32] holds for all inequalities between the planets of a solar system. This comes forward in atoms $n\bar{\nu}_l$ and pl as a criterion for an orbit quantized sequence

$$k^N_{n\bar{\nu}_l} = \frac{m_n}{m_{\bar{\nu}_l}}, \quad k^N_{pl} = \frac{m_p}{m_l}. \tag{131}$$

Therefore, uniting Eqs. (131) with the condition (130), one can again find that

$$m_p m_{\bar{\nu}_l} \neq m_n m_l, \tag{132}$$

which confirms the validity of the theorem 2.

Equations (127) and the first of Eqs. (131) together with Eqs.(115)-(117) at $s = n$ $(l = \bar{\nu}_l)$ allow us to establish the following four intraatomic Newton connections:

$$v^N_{\bar{\nu}_l n} = \frac{m_{\bar{\nu}_l}}{m_{pl}}\sqrt{\frac{m_p}{m_n}}c, \tag{133}$$

$$r^N_{\bar{\nu}_l n} = \left(\frac{m_n}{m_{\bar{\nu}_l}}\right)^2 \frac{\hbar}{m_p c}, \tag{134}$$

$$E^N_{\bar{\nu}_l n} = -\frac{1}{2}\frac{m_{\bar{\nu}_l}}{m_{pl}}\left(\frac{m_p}{m_n}\right)^{3/2} E^N_{\bar{\nu}_l}, \tag{135}$$

$$E^N_{\bar{\nu}_l} = m_{\bar{\nu}_l} c^2. \tag{136}$$

Comparing Eqs. (128) and the second of Eqs. (131) with Eqs. (115)-(117) having in view an atom $s = p$ $(l = l)$, one can also make a conclusion that

$$v^N_{lp} = \frac{m_l}{m_{pl}} \sqrt{\frac{m_n}{m_p}} c, \tag{137}$$

$$r^N_{lp} = \left(\frac{m_p}{m_l}\right)^2 \frac{\hbar}{m_n c}, \tag{138}$$

$$E^N_{lp} = -\frac{1}{2} \frac{m_l}{m_{pl}} \left(\frac{m_n}{m_p}\right)^{3/2} E^N_l, \tag{139}$$

$$E^N_l = m_l c^2. \tag{140}$$

Another possibility is that the insertion of Eqs. (127) and (128) in a relation (107) at $s = p$ (n) and $l = l$ $(\bar{\nu}_l)$ transforms the inequality $c^{n\bar{\nu}_l}_m \neq c^{pl}_m$ into

$$\left(\frac{e^o_{n\bar{\nu}_l}}{e_{pl}}\right)^2 \frac{b^{n\bar{\nu}_l}_{mn} m_{\bar{\nu}_l}}{m_p} \neq \left(\frac{e^o_{pl}}{e_{pl}}\right)^2 \frac{b^{pl}_{mn} m_l}{m_n}, \tag{141}$$

where $e^o_{n\bar{\nu}_l}$ (e^o_{pl}) characterizes the orbital charge of an atom with a nucleus consisting of neutrons (antiprotons) including its dimensionless size.

To elucidate upon these ideas, it is desirable to relate, based on the theorem 2, the functions $(e^o_{n\bar{\nu}_l}/e_{pl})^2$ and $(e^o_{pl}/e_{pl})^2$ to individual variables

$$\left(\frac{e^o_{n\bar{\nu}_l}}{e_{pl}}\right)^2 = \frac{m_n}{b^{n\bar{\nu}_l}_{mn} m_{\bar{\nu}_l}}, \quad b^{n\bar{\nu}_l}_{ch} = \frac{m_n}{b^{n\bar{\nu}_l}_{mn} m_{\bar{\nu}_l}} \frac{e^2_{pl}}{e_n e_{\bar{\nu}_l}}, \tag{142}$$

$$\left(\frac{e^o_{pl}}{e_{pl}}\right)^2 = \frac{m_p}{b^{pl}_{mn} m_l}, \quad b^{pl}_{ch} = \frac{m_p}{b^{pl}_{mn} m_l} \frac{e^2_{pl}}{e_p e_l}. \tag{143}$$

These variables together with Eqs. (127) and (128) predict two explicit values of a relation (107) in the nucleus type dependence

$$c^{n\bar{\nu}_l}_m = \frac{m_n}{m_p}, \quad c^{pl}_m = \frac{m_p}{m_n}. \tag{144}$$

Their inequality leads us once more to

$$m^2_n \neq m^2_p, \tag{145}$$

confirming that the equality (122) expresses, in the case of a Coulomb force between l and s, the idea of an inequality $v^C_{\bar{\nu}_l n} \neq v^C_{lp}$ related to the unidenticality

$$\frac{1}{k^C_{n\bar{\nu}_l}} \frac{m_n}{b^{n\bar{\nu}_l}_{mn} m_{\bar{\nu}_l}} \neq \frac{1}{k^C_{pl}} \frac{m_p}{b^{pl}_{mn} m_l}. \tag{146}$$

At the same time, the difference in speeds $v_{\bar{\nu}_l n}$ and v_{lp} is general and does not depend on whether the intraatomic forces are Newton or Coulomb in nature. Therefore, without contradicting flavor and baryon symmetry laws, the functions such as $(1/k_{n\bar{\nu}_l})$ and $(1/k_{pl})$

replace the functional connections (130) and (146) with the same condition (132) arising from the unidenticality (146) in cases when

$$k^C_{n\bar{\nu}_l} = \frac{m_{\bar{\nu}_l}}{m_p}, \quad k^C_{pl} = \frac{m_l}{m_n}. \tag{147}$$

It is not excluded, however, that

$$k^C_{n\bar{\nu}_l} = c_k^{n\bar{\nu}_l} k^N_{n\bar{\nu}_l}, \quad k^C_{pl} = c_k^{pl} k^N_{pl}, \tag{148}$$

$$c_k^{n\bar{\nu}_l} = \frac{m^2_{\bar{\nu}_l}}{m_p m_n}, \quad c_k^{pl} = \frac{m^2_l}{m_p m_n}. \tag{149}$$

Uniting Eqs. (142) and the first of Eqs. (144), (147), and

$$b^{n\bar{\nu}_l}_{mc} = c_m^{n\bar{\nu}_l} b^{n\bar{\nu}_l}_{mn}, \quad b^{pl}_{mc} = c_m^{pl} b^{pl}_{mn} \tag{150}$$

with Eqs. (122)-(124) at $s = n$ ($l = \bar{\nu}_l$), we find the following four intraatomic Coulomb connections:

$$v^C_{\bar{\nu}_l n} = \frac{m_n}{m_{\bar{\nu}_l}} \sqrt{\frac{m_p m_n}{m^2_{pl}}} c, \tag{151}$$

$$r^C_{\bar{\nu}_l n} = \left(\frac{m_{\bar{\nu}_l}}{m_n}\right)^2 \frac{\hbar}{m_p c}, \tag{152}$$

$$E^C_{\bar{\nu}_l n} = -\frac{1}{2}\left(\frac{m_n}{m_{\bar{\nu}_l}}\right)^2 \sqrt{\frac{m_p m_n}{m^2_{pl}}} E^C_n, \tag{153}$$

$$E^C_n = m_n c^2. \tag{154}$$

Accepting in Eqs. (122)-(124) an atom with $s = p$ ($l = l$) using Eqs. (143) and the second of Eqs. (144), (147), and (150), we are led to the equalities

$$v^C_{lp} = \frac{m_p}{m_l} \sqrt{\frac{m_p m_n}{m^2_{pl}}} c, \tag{155}$$

$$r^C_{lp} = \left(\frac{m_l}{m_p}\right)^2 \frac{\hbar}{m_n c}, \tag{156}$$

$$E^C_{lp} = -\frac{1}{2}\left(\frac{m_p}{m_l}\right)^2 \sqrt{\frac{m_p m_n}{m^2_{pl}}} E^C_p, \tag{157}$$

$$E^C_p = m_p c^2. \tag{158}$$

A comparison of Eqs. (151) and (155) with Eqs. (133) and (137) shows that

$$v^C_{\bar{\nu}_l n} = c_v^{n\bar{\nu}_l} v^N_{\bar{\nu}_l n}, \quad v^C_{lp} = c_v^{pl} v^N_{lp}, \tag{159}$$

$$c_v^{n\bar{\nu}_l} = \left(\frac{m_n}{m_{\bar{\nu}_l}}\right)^2, \quad c_v^{pl} = \left(\frac{m_p}{m_l}\right)^2. \tag{160}$$

If we, for definiteness, consider the structural functions (134), (138), (152), and (156), it is easy to observe the differences

$$r^C_{\bar{\nu}_l n} = c_r^{n\bar{\nu}_l} r^N_{\bar{\nu}_l n}, \quad r^C_{lp} = c_r^{pl} r^N_{lp}, \tag{161}$$

$$c_r^{n\bar{\nu}_l} = \left(\frac{m_{\bar{\nu}_l}}{m_n}\right)^4, \quad c_r^{pl} = \left(\frac{m_l}{m_p}\right)^4, \tag{162}$$

which show that Eqs. (151), (152), (155) and (156) become defined owing to a relation (107) expressing the ideas of the Planck mass and charge. Therefore, to reveal the connections (115) and (116) and to use their contributions in a quantitative analysis of atomic systems, one must elucidate the nature of a Planck particle that is responsible for the harmony between the Coulomb and Newton components of each structural part of an intraatomic united force.

Thus, we can expect from the nature of an atom itself that v_{ls}^N, r_{ls}^N, and E_{ls}^N must be compatible with v_{ls}^C, r_{ls}^C, and E_{ls}^C and that, consequently, v_{ls}, r_{ls}, and E_{ls} are equal to the following:

$$v_{ls} = v_{ls}^N + v_{ls}^C, \tag{163}$$

$$r_{ls} = r_{ls}^N + r_{ls}^C, \tag{164}$$

$$E_{ls} = E_{ls}^N + E_{ls}^C. \tag{165}$$

Here, however, we will use the contributions

$$v_{ls} = v_{ls}^C, \quad r_{ls} = r_{ls}^C, \quad E_{ls} = E_{ls}^C. \tag{166}$$

This approach does not simultaneously exclude the following relations:

$$m_l = m_l^E + m_l^W, \quad m_s = m_s^E + m_s^W, \tag{167}$$

$$e_l = e_l^E + e_l^W, \quad e_s = e_s^E + e_s^W. \tag{168}$$

At the choice of the number N_n of neutrons and the number $N_{\bar{\nu}_l}$ of antineutrinos, Eqs. (151)-(153) generalize Eqs. (166) to the case of all types of atoms with nuclei that do not contain antiprotons. This gives the right to define, on their basis, the functions $v_{\bar{\nu}_l n}$, $r_{\bar{\nu}_l n}$, $T_{\bar{\nu}_l n}$, and $E_{\bar{\nu}_l n}$ in a general form as follows:

$$v_{\bar{\nu}_l n} = \frac{m_n}{m_{\bar{\nu}_l}} \left(\frac{N_n}{N_{\bar{\nu}_l}}\right) \sqrt{\frac{N_p N_n m_p m_n}{m_{pl}^2}} c, \tag{169}$$

$$r_{\bar{\nu}_l n} = \left(\frac{m_{\bar{\nu}_l}}{m_n}\right)^2 \left(\frac{N_{\bar{\nu}_l}}{N_n}\right)^2 \frac{\hbar}{N_p m_p c}, \tag{170}$$

$$T_{\bar{\nu}_l n} = \frac{2\pi}{c} \left(\frac{m_{\bar{\nu}_l}}{m_n}\right)^3 \left(\frac{N_{\bar{\nu}_l}}{N_n}\right)^3 \sqrt{\frac{m_{pl}^2}{N_p N_n m_p m_n}} \frac{\hbar}{N_p m_p c}, \tag{171}$$

$$E_{\bar{\nu}_l n} = -\frac{1}{2} \left(\frac{m_n}{m_{\bar{\nu}_l}}\right)^2 \left(\frac{N_n}{N_{\bar{\nu}_l}}\right)^2 \sqrt{\frac{N_p^3 N_n^3 m_p m_n}{m_{pl}^2}} E_n, \tag{172}$$

$$E_n = m_n c^2. \tag{173}$$

In the presence of a number N_p of antiprotons and a number N_l of leptons, the compound structure of Eqs. (155)-(157) expresses the ideas of all atoms with nuclei without neutrons. These ideas transform v_{lp}, r_{lp}, T_{lp}, and E_{lp} from Eqs. (166) into

$$v_{lp} = \frac{m_p}{m_l} \left(\frac{N_p}{N_l}\right) \sqrt{\frac{N_p N_n m_p m_n}{m_{pl}^2}} c, \tag{174}$$

$$r_{lp} = \left(\frac{m_l}{m_p}\right)^2 \left(\frac{N_l}{N_p}\right)^2 \frac{\hbar}{N_n m_n c}, \tag{175}$$

$$T_{lp} = \frac{2\pi}{c} \left(\frac{m_l}{m_p}\right)^3 \left(\frac{N_l}{N_p}\right)^3 \sqrt{\frac{m_{pl}^2}{N_p N_n m_p m_n}} \frac{\hbar}{N_n m_n c}, \tag{176}$$

$$E_{lp} = -\frac{1}{2} \left(\frac{m_p}{m_l}\right)^2 \left(\frac{N_p}{N_l}\right)^2 \sqrt{\frac{N_p^3 N_n^3 m_p m_n}{m_{pl}^2}} E_p, \tag{177}$$

$$E_p = m_p c^2. \tag{178}$$

For a quantitative analysis of atomic systems, it is desirable to use the uranium family, the root of which may be symbolically presented as

$$Fn_{92}^{92} + U_{92}^{92} \rightarrow U_{92}^{184}, \tag{179}$$

where Fn_{92}^{92} is considered as an Al-Fargoniy atom of the uranium family. Its orbital structure has the form

$$Fn_{92}^{92} \rightarrow O_{\bar{\nu}_\epsilon}^L, \quad O_{\bar{\nu}_\epsilon}^R, \quad O_{\bar{\nu}_e}^L, \quad O_{\bar{\nu}_e}^R, \quad O_{\bar{\nu}_\mu}^L, \quad O_{\bar{\nu}_\mu}^R, \quad O_{\bar{\nu}_\tau}^L, \quad O_{\bar{\nu}_\tau}^R \rightarrow N_{\bar{\nu}_\epsilon}^o = 1, 2, \quad N_{\bar{\nu}_e}^o = 3, 4,$$

$$N_{\bar{\nu}_\mu}^o = 5, 6, \quad N_{\bar{\nu}_\tau}^o = 7, 8 \rightarrow N_{\bar{\nu}_\epsilon} = 13, 13, \quad N_{\bar{\nu}_e} = 12, 12, \quad N_{\bar{\nu}_\mu} = 11, 11, \quad N_{\bar{\nu}_\tau} = 10, 10.$$

The antineutrino orbits of even orders $N_{\bar{\nu}_l}^o = 2, 4, 6, 8$ contain right-handed particles. However, the question of restrictions on their masses remains open.

Therefore, at a given stage, we will start from the fact that Eqs. (20), (40),(41), (43), and (44) may be considered as the masses of left-handed fermions. In this case, Eq. (169) for the speeds of antineutrinos in orbits of an odd ($N_{\bar{\nu}_l}^o = 1, 3, 5, 7$) order leads to

$$v_{\bar{\nu}_\epsilon n} < 9.7198227 \cdot 10^4 \text{ m/s},$$

$$v_{\bar{\nu}_e n} < 6.1115698 \text{ m/s},$$

$$v_{\bar{\nu}_\mu n} < 9.8046575 \cdot 10^{-5} \text{ m/s},$$

$$v_{\bar{\nu}_\tau n} < 1.0074016 \cdot 10^{-6} \text{ m/s}.$$

In a similarly, one can get from (170) their radii

$$r_{\bar{\nu}_\epsilon n} < 1.0886828 \cdot 10^{-45} \text{ m},$$

$$r_{\bar{\nu}_e n} < 2.7536738 \cdot 10^{-37} \text{ m},$$

$$r_{\bar{\nu}_\mu n} < 1.0699246 \cdot 10^{-27} \text{ m},$$

$$r_{\bar{\nu}_\tau n} < 1.0134743 \cdot 10^{-23} \text{ m}.$$

At these values, the periods (171) have the restrictions

$$T_{\bar{\nu}_\epsilon n} < 7.0375728 \cdot 10^{-50} \text{ s},$$

$$T_{\bar{\nu}_e n} < 2.8309981 \cdot 10^{-37} \text{ s},$$

$$T_{\bar{\nu}_\mu n} < 6.8564710 \cdot 10^{-23} \text{ s},$$

$$T_{\bar{\nu}_\tau n} < 6.3210611 \cdot 10^{-17} \text{ s}.$$

One can also estimate the absolute energies (172) that

$$E_{\bar{\nu}_\epsilon n} < 6.4208393 \cdot 10^{20} \text{ eV},$$

$$E_{\bar{\nu}_e n} < 2.5385204 \cdot 10^{12} \text{ eV},$$

$$E_{\bar{\nu}_\mu n} < 6.5334108 \cdot 10^{2} \text{ eV},$$

$$E_{\bar{\nu}_\tau n} < 6.8973205 \cdot 10^{-2} \text{ eV}.$$

Taking into account the availability in U^{92}_{92} of an orbital sequence

$$U^{92}_{92} \to O^L_\epsilon, \quad O^R_\epsilon, \quad O^L_e, \quad O^R_e, \quad O^L_\mu, \quad O^R_\mu, \quad O^L_\tau, \quad O^R_\tau \to N^o_\epsilon = 1, 2, \quad N^o_e = 3, 4,$$

$$N^o_\mu = 5, 6, \quad N^o_\tau = 7, 8 \to N_\epsilon = 13, 13, \quad N_e = 12, 12, \quad N_\mu = 11, 11, \quad N_\tau = 10, 10,$$

for the speeds (174), in the case of left-handed leptons, we find

$$v_{\epsilon p} = 4.3408534 \cdot 10^{-2} \text{ m/s},$$

$$v_{ep} = 2.9858953 \cdot 10^{-5} \text{ m/s},$$

$$v_{\mu p} = 1.5753578 \cdot 10^{-7} \text{ m/s},$$

$$v_{\tau p} = 1.0303643 \cdot 10^{-8} \text{ m/s}.$$

Given the masses (14), (38), (39), (43), and (44), it is not difficult to get from Eq. (175) the following radii of lepton orbits of an odd ($N^o_l = 1, 3, 5, 7$) order:

$$r_{\epsilon p} = 5.4509174 \cdot 10^{-33} \text{ m},$$

$$r_{ep} = 1.1520482 \cdot 10^{-26} \text{ m},$$

$$r_{\mu p} = 4.1386757 \cdot 10^{-22} \text{ m},$$

$$r_{\tau p} = 9.6747152 \cdot 10^{-20} \text{ m}.$$

It is also relevant to replace Eq. (176) by the exact periods

$$T_{\epsilon p} = 7.8899517 \cdot 10^{-31} \text{ s},$$

$$T_{ep} = 2.4242419 \cdot 10^{-21} \text{ s},$$

$$T_{\mu p} = 1.6506768 \cdot 10^{-14} \text{ s},$$

$$T_{\tau p} = 7.8524520 \cdot 10^{-11} \text{ s}.$$

In the same way, one can see that the absolute energies (177) are equal to

$$E_{\epsilon p} = 1.2788721 \cdot 10^{8} \text{ eV},$$

$$E_{ep} = 60.5098452 \text{ eV},$$

$$E_{\mu p} = 1.6843615 \cdot 10^{-3} \text{ eV},$$

$$E_{\tau p} = 7.2054072 \cdot 10^{-6} \text{ eV}.$$

These results clearly show that each of our formulas contains all of connections necessary for the steadiness and completeness of an atom. Some of them state that a change in the radius of any of the structural particles within an atom originates of the orbit type dependence.

This does not imply of course that the lifetimes of particles in orbits of nuclei must remain unchangeable. Thereby, a role of gravity appears in atomic construction.

10. Bosons and antineutrinos in atoms with nuclei of a spinless structure

If we choose an atom $pnl\bar{\nu}_l$ with a nucleus pn with an equal quantity of neutrons and antiprotons, at which around each lepton l revolves in orbit of the leptonic string $l\bar{\nu}_l$ of its own antineutrino $\bar{\nu}_l$, then for the case $s = lpn$ and $l = \bar{\nu}_l$ when Eq. (119) comes forward as the equality

$$(v^N_{\bar{\nu}_l lpn})^2 r^N_{\bar{\nu}_l lpn} = G_N m_l, \tag{180}$$

we establish, on the basis of Eqs. (115) and (116), another highly characteristic connection between the variables of atomic $pnl\bar{\nu}_l$ system and its orbital lepton $l\bar{\nu}_l$ atom:

$$\left(\frac{m^o_{l\bar{\nu}_l pn}}{m_{pl}}\right)^2 \frac{m_{pn}}{b^{l\bar{\nu}_l pn}_{mn} m_{\bar{\nu}_l}} = \left(\frac{m^o_{pnl\bar{\nu}_l}}{m_{pl}}\right)^2 \frac{m_l}{b^{pnl\bar{\nu}_l}_{mn} m_{l\bar{\nu}_l}}, \tag{181}$$

where one must keep in mind the united masses

$$m_{l\bar{\nu}_l} = m_l + m_{\bar{\nu}_l}, \quad m_{pn} = m_p + m_n \tag{182}$$

and $b^{l\bar{\nu}_l pn}_{mn}$ $(b^{pnl\bar{\nu}_l}_{mn})$ denotes the dimensionless size of an orbital mass $m^o_{l\bar{\nu}_l pn}$ $(m^o_{pnl\bar{\nu}_l})$ of an atom in which the lepton l (boson pn) is the nucleus.

The additional index pn in $v^N_{\bar{\nu}_l lpn}$, $r^N_{\bar{\nu}_l lpn}$, $m^o_{l\bar{\nu}_l pn}$, and $b^{l\bar{\nu}_l pn}_{mn}$ distinguishes them from the corresponding sizes in atoms with nuclei with excess neutrons or antiprotons.

In conformity with the theorem 1, we conclude, from Eq. (181), that

$$\left(\frac{m^o_{l\bar{\nu}_l pn}}{m_{pl}}\right)^2 = \frac{m_{pn}}{b^{l\bar{\nu}_l pn}_{mn} m_{\bar{\nu}_l}}, \quad b^{l\bar{\nu}_l pn}_{mn} = \frac{m_{pl}}{m_{\bar{\nu}_l}}\sqrt{\frac{m_{pn}}{m_l}}, \tag{183}$$

$$\left(\frac{m^o_{pnl\bar{\nu}_l}}{m_{pl}}\right)^2 = \frac{m_l}{b^{pnl\bar{\nu}_l}_{mn} m_{l\bar{\nu}_l}}, \quad b^{pnl\bar{\nu}_l}_{mn} = \frac{m_{pl}}{m_{l\bar{\nu}_l}}\sqrt{\frac{m_l}{m_{pn}}}. \tag{184}$$

Their unification with Eq. (181) convinces us here that

$$m_l m_{pn} = m_l m_{pn} \tag{185}$$

for both a flavor and a baryon symmetry.

If we relate Eqs. (183) and (184) to Eq. (115) at $s = pn$ (lpn) and $l = l\bar{\nu}_l$ $(\bar{\nu}_l)$, then the unidenticality of speeds $v^N_{\bar{\nu}_l lpn} \neq v^N_{l\bar{\nu}_l pn}$ will have the functional structure

$$\frac{1}{k^N_{l\bar{\nu}_l pn}} \frac{m_{pn}}{b^{l\bar{\nu}_l pn}_{mn} m_{\bar{\nu}_l}} \neq \frac{1}{k^N_{pnl\bar{\nu}_l}} \frac{m_l}{b^{pnl\bar{\nu}_l}_{mn} m_{l\bar{\nu}_l}}. \tag{186}$$

The difference in sizes with speeds $v^N_{\bar{\nu}_l lpn}$ and $v^N_{l\bar{\nu}_l pn}$ is a consequence of an orbit quantized sequence. Such a symmetry corresponds in inequalities (186), namely, atoms $l\bar{\nu}_l$ and $pnl\bar{\nu}_l$ to one of highly important implications of the theorem 2 that in them

$$k^N_{l\bar{\nu}_l pn} = \frac{m_l}{m_{\bar{\nu}_l}}, \quad k^N_{pnl\bar{\nu}_l} = \frac{m_{pn}}{m_{l\bar{\nu}_l}}. \tag{187}$$

Therefore, it is not surprising that the structural picture of both types of connections (186) and (187) predicts the flavor symmetrical inequality

$$m_{pn}m_{\bar{\nu}_l} \neq m_l m_{l\bar{\nu}_l} \tag{188}$$

for the conservation of the lepton and baryon numbers.

Thus, jointly with Eqs. (183) and the first of Eqs. (187), the equalities (115)-(117) define, at $s = lpn$ $(l = \bar{\nu}_l)$, the following intrastring Newton connections:

$$v^N_{\bar{\nu}_l lpn} = \frac{m_{\bar{\nu}_l}}{m_{pl}}\sqrt{\frac{m_{pn}}{m_l}}c, \tag{189}$$

$$r^N_{\bar{\nu}_l lpn} = \left(\frac{m_l}{m_{\bar{\nu}_l}}\right)^2 \frac{\hbar}{m_{pn}c}, \tag{190}$$

$$E^N_{\bar{\nu}_l lpn} = -\frac{1}{2}\frac{m_{\bar{\nu}_l}}{m_{pl}}\left(\frac{m_{pn}}{m_l}\right)^{3/2} E^N_{\nu_l}. \tag{191}$$

Using Eqs. (115)-(117) for $s = pn$ $(l = l\bar{\nu}_l)$ accepting Eqs. (184) and the second of Eqs. (187), we are led to the implications about that

$$v^N_{l\bar{\nu}_l pn} = \frac{m_{l\bar{\nu}_l}}{m_{pl}}\sqrt{\frac{m_l}{m_{pn}}}c, \tag{192}$$

$$r^N_{l\bar{\nu}_l pn} = \left(\frac{m_{pn}}{m_{l\bar{\nu}_l}}\right)^2 \frac{\hbar}{m_l c}, \tag{193}$$

$$E^N_{l\bar{\nu}_l pn} = -\frac{1}{2}\frac{m_{l\bar{\nu}_l}}{m_{pl}}\left(\frac{m_l}{m_{pn}}\right)^{3/2} E^N_{l\bar{\nu}_l}, \tag{194}$$

$$E^N_{l\bar{\nu}_l} = m_{l\bar{\nu}_l}c^2. \tag{195}$$

Another important consequence of Eqs. (183) and (184) is that at $s = pn$ (lpn) and $l = l\bar{\nu}_l$ $(\bar{\nu}_l)$, a relation (107) replaces the inequality $c_m^{l\bar{\nu}_l pn} \neq c_m^{pnl\bar{\nu}_l}$ for

$$\left(\frac{e^o_{l\bar{\nu}_l pn}}{e_{pl}}\right)^2 \frac{b^{l\bar{\nu}_l pn}_{mn} m_{\bar{\nu}_l}}{m_{pn}} \neq \left(\frac{e^o_{pnl\bar{\nu}_l}}{e_{pl}}\right)^2 \frac{b^{pnl\bar{\nu}_l}_{mn} m_{l\bar{\nu}_l}}{m_l} \tag{196}$$

in which an orbital charge $e^o_{l\bar{\nu}_l pn}$ $(e^o_{pnl\bar{\nu}_l})$ of atomic system $l\bar{\nu}_l$ $(pnl\bar{\nu}_l)$ includes the dimensionless size.

Here it is relevant to note that the flavor symmetry under condition (196) is fully compatible with ideas of baryon symmetry. Such a principle requires one to use the theorem 2 and to define $(e^o_{l\bar{\nu}_l pn}/e_{pl})^2$ and $(e^o_{pnl\bar{\nu}_l}/e_{pl})^2$ in a general form

$$\left(\frac{e^o_{l\bar{\nu}_l pn}}{e_{pl}}\right)^2 = \frac{m_l}{b^{l\bar{\nu}_l pn}_{mn} m_{\bar{\nu}_l}}, \quad b^{l\bar{\nu}_l pn}_{ch} = \frac{m_l}{b^{l\bar{\nu}_l pn}_{mn} m_{\bar{\nu}_l}}\frac{e^2_{pl}}{e_l e_{\bar{\nu}_l}}, \tag{197}$$

$$\left(\frac{e^o_{pnl\bar{\nu}_l}}{e_{pl}}\right)^2 = \frac{m_{pn}}{b^{pnl\bar{\nu}_l}_{mn} m_{l\bar{\nu}_l}}, \quad b^{pnl\bar{\nu}_l}_{ch} = \frac{m_{pn}}{b^{pnl\bar{\nu}_l}_{mn} m_{l\bar{\nu}_l}}\frac{e^2_{pl}}{e_{pn} e_{l\bar{\nu}_l}}. \tag{198}$$

Together with these expressions, Eqs. (183) and (184) constitute two united connections from Eq. (107) in the nucleus type dependence

$$c_m^{l\bar{\nu}_l pn} = \frac{m_l}{m_{pn}}, \quad c_m^{pnl\bar{\nu}_l} = \frac{m_{pn}}{m_l}. \tag{199}$$

Such connections confirm that nature does not exclude both a flavor and a baryon symmetry of that inequality that follows from a relation (107) for the corresponding two types of atoms.

In these circumstances, the functional connection (196) becomes the flavor symmetrical inequality

$$m_l^2 \neq m_{pn}^2, \tag{200}$$

and the unidenticality $v^C_{\bar{\nu}_l lpn} \neq v^C_{l\bar{\nu}_l pn}$ of speeds (122) in the Coulomb construction of atomic systems $l\bar{\nu}_l$ and $pnl\bar{\nu}_l$ behaves as

$$\frac{1}{k^C_{l\bar{\nu}_l pn}} \frac{m_l}{b_{mn}^{l\bar{\nu}_l pn} m_{\bar{\nu}_l}} \neq \frac{1}{k^C_{pnl\bar{\nu}_l}} \frac{m_{pn}}{b_{mn}^{pnl\bar{\nu}_l} m_{l\bar{\nu}_l}}. \tag{201}$$

However, despite this, $(1/k_{l\bar{\nu}_l pn})$ and $(1/k_{pnl\bar{\nu}_l})$ lead us from inequalities (186) and (201) to the same unidenticality (188) implied from inequality (201) only in the case when

$$k^C_{l\bar{\nu}_l pn} = \frac{m_{\bar{\nu}_l}}{m_{pn}}, \quad k^C_{pnl\bar{\nu}_l} = \frac{m_{l\bar{\nu}_l}}{m_l}. \tag{202}$$

But here we must recognize that

$$k^C_{l\bar{\nu}_l pn} = c_k^{l\bar{\nu}_l pn} k^N_{l\bar{\nu}_l pn}, \quad k^C_{pnl\bar{\nu}_l} = c_k^{pnl\bar{\nu}_l} k^N_{pnl\bar{\nu}_l}, \tag{203}$$

$$c_k^{l\bar{\nu}_l pn} = \frac{m^2_{\bar{\nu}_l}}{m_{pn} m_l}, \quad c_k^{pnl\bar{\nu}_l} = \frac{m^2_{l\bar{\nu}_l}}{m_{pn} m_l}. \tag{204}$$

By following the structure of Eqs. (197) including the first of Eqs. (199), (202), and

$$b_{mc}^{l\bar{\nu}_l pn} = c_m^{l\bar{\nu}_l pn} b_{mn}^{l\bar{\nu}_l pn}, \quad b_{mc}^{pnl\bar{\nu}_l} = c_m^{pnl\bar{\nu}_l} b_{mn}^{pnl\bar{\nu}_l}, \tag{205}$$

one can find from Eqs. (122)-(124) that at $s = lpn$ $(l = \bar{\nu}_l)$, the intrastring Coulomb connections in orbits of an atom $pnl\bar{\nu}_l$ have the forms

$$v^C_{\bar{\nu}_l lpn} = \frac{m_l}{m_{\bar{\nu}_l}} \sqrt{\frac{m_{pn} m_l}{m^2_{pl}}} c, \tag{206}$$

$$r^C_{\bar{\nu}_l lpn} = \left(\frac{m_{\bar{\nu}_l}}{m_l}\right)^2 \frac{\hbar}{m_{pn} c}, \tag{207}$$

$$E^C_{\bar{\nu}_l lpn} = -\frac{1}{2} \left(\frac{m_l}{m_{\bar{\nu}_l}}\right)^2 \sqrt{\frac{m_{pn} m_l}{m^2_{pl}}} E^C_l, \tag{208}$$

$$E^C_l = m_l c^2. \tag{209}$$

The solution (198) together with the second of Eqs. (199), (202), and (205), with the use of Eqs. (122)-(124) for an atom $s = pn$ $(l = l\bar{\nu}_l)$, allows one to derive four more equations:

$$v^C_{l\bar{\nu}_l pn} = \frac{m_{pn}}{m_{l\bar{\nu}_l}} \sqrt{\frac{m_{pn} m_l}{m^2_{pl}}} c, \tag{210}$$

$$r^{C}_{l\bar{\nu}_l pn} = \left(\frac{m_{l\bar{\nu}_l}}{m_{pn}}\right)^2 \frac{\hbar}{m_l c}, \tag{211}$$

$$E^{C}_{l\bar{\nu}_l p} = -\frac{1}{2}\left(\frac{m_{pn}}{m_{l\bar{\nu}_l}}\right)^2 \sqrt{\frac{m_{pn} m_l}{m_{pl}^2}} E^{C}_{pn}, \tag{212}$$

$$E^{C}_{pn} = m_{pn} c^2. \tag{213}$$

The intrastring structural functions (206) and (210) do not coincide with Eqs. (189) and (192), and consequently, among them there are the relations

$$v^{C}_{\bar{\nu}_l lpn} = c_v^{l\bar{\nu}_l pn} v^{N}_{\bar{\nu}_l lpn}, \quad v^{C}_{l\bar{\nu}_l pn} = c_v^{pnl\bar{\nu}_l} v^{N}_{l\bar{\nu}_l pn}, \tag{214}$$

$$c_v^{l\bar{\nu}_l pn} = \left(\frac{m_l}{m_{\bar{\nu}_l}}\right)^2, \quad c_v^{pnl\bar{\nu}_l} = \left(\frac{m_{pn}}{m_{l\bar{\nu}_l}}\right)^2. \tag{215}$$

If one compares Eqs. (190), (193), (207), and (211), then one can see that

$$r^{C}_{\bar{\nu}_l lpn} = c_r^{l\bar{\nu}_l pn} r^{N}_{\bar{\nu}_l lpn}, \quad r^{C}_{l\bar{\nu}_l pn} = c_r^{pnl\bar{\nu}_l} r^{N}_{l\bar{\nu}_l pn}, \tag{216}$$

$$c_r^{l\bar{\nu}_l pn} = \left(\frac{m_{\bar{\nu}_l}}{m_l}\right)^4, \quad c_r^{pnl\bar{\nu}_l} = \left(\frac{m_{l\bar{\nu}_l}}{m_{pn}}\right)^4. \tag{217}$$

In the establishment of (206), (207), (210), and (211), we have used a relation (107), because in it appear the dynamical aspects of a Planck particle responsible for the harmony between the Coulomb and Newton parts of any structural component of the intraatomic unified force. Insofar as its role allowing us to reveal the connections (115), (116), and to include in the discussion their contributions is concerned, it calls for special presentation.

However, the fact that the very existence of atomic system does not exclude the harmony of forces of a different nature, testifies about a role of gravity in its construction. The functions (115)-(117) must therefore be comparable with Eqs. (122)-(124) at the unification of forces in a unified whole. But here we can use, for example, the contributions (166), recognizing that any of Eqs. (163)-(165) could refine the coordinates of intraatomic particles.

The number of both antineutrinos and leptons in $l\bar{\nu}_l$ is not different from unity. Such an equality, however, takes place regardless of the boson structure of atomic system $pnl\bar{\nu}_l$, namely, of that in it

$$N_{pn} = N_p, \quad N_{l\bar{\nu}_l} = N_l. \tag{218}$$

Thus, at $N_p > 1$, Eqs. (206)-(208) lead us from Eqs. (166) to the following:

$$v_{\bar{\nu}_l lpn} = \frac{m_l}{m_{\bar{\nu}_l}} \sqrt{\frac{m_{pn} m_l}{m_{pl}^2}} c, \tag{219}$$

$$r_{\bar{\nu}_l lpn} = \left(\frac{m_{\bar{\nu}_l}}{m_l}\right)^2 \frac{\hbar}{m_{pn} c}, \tag{220}$$

$$T_{\bar{\nu}_l lpn} = \frac{2\pi}{c}\left(\frac{m_{\bar{\nu}_l}}{m_l}\right)^3 \sqrt{\frac{m_{pl}^2}{m_{pn} m_l}} \frac{\hbar}{m_{pn} c}, \tag{221}$$

$$E_{\bar{\nu}_l lpn} = -\frac{1}{2}\left(\frac{m_l}{m_{\bar{\nu}_l}}\right)^2 \sqrt{\frac{m_{pn} m_l}{m_{pl}^2}} E_l, \tag{222}$$

$$E_l = m_l c^2, \quad m_{pn} = N_p(m_p + m_n). \tag{223}$$

Taking into account that in the presence of Eqs. (218), Eqs. (210)-(212) generalize Eqs. (166) for all types of atomic systems with spinless nuclei, we get

$$v_{l\bar{\nu}_l pn} = \frac{m_{pn}}{N_{l\bar{\nu}_l} m_{l\bar{\nu}_l}} \sqrt{\frac{m_{pn} m_l}{m_{pl}^2}} c, \tag{224}$$

$$r_{l\bar{\nu}_l pn} = \left(\frac{N_{l\bar{\nu}_l} m_{l\bar{\nu}_l}}{m_{pn}}\right)^2 \frac{\hbar}{m_l c}, \tag{225}$$

$$T_{l\bar{\nu}_l pn} = \frac{2\pi}{c} \left(\frac{N_{l\bar{\nu}_l} m_{l\bar{\nu}_l}}{m_{pn}}\right)^3 \sqrt{\frac{m_{pl}^2}{m_{pn} m_l}} \frac{\hbar}{m_l c}, \tag{226}$$

$$E_{l\bar{\nu}_l pn} = -\frac{1}{2} \left(\frac{m_{pn}}{N_{l\bar{\nu}_l} m_{l\bar{\nu}_l}}\right)^2 \sqrt{\frac{m_{pn} m_l}{m_{pl}^2}} E_{pn}, \tag{227}$$

$$E_{pn} = m_{pn} c^2. \tag{228}$$

To show their structural features, one can use the uranium root U_{92}^{184} as an example:

$$U_{92}^{184} \rightarrow O_{\epsilon\bar{\nu}_\epsilon}^L, \quad O_{\epsilon\bar{\nu}_\epsilon}^R, \quad O_{e\bar{\nu}_e}^L, \quad O_{e\bar{\nu}_e}^R, \quad O_{\mu\bar{\nu}_\mu}^L, \quad O_{\mu\bar{\nu}_\mu}^R, \quad O_{\tau\bar{\nu}_\tau}^L, \quad O_{\tau\bar{\nu}_\tau}^R \rightarrow N_{\epsilon\bar{\nu}_\epsilon}^o = 1, 2,$$
$$N_{e\bar{\nu}_e}^o = 3, 4, \quad N_{\mu\bar{\nu}_\mu}^o = 5, 6, \quad N_{\tau\bar{\nu}_\tau}^o = 7, 8 \rightarrow N_{\epsilon\bar{\nu}_\epsilon} = 13, 13, \quad N_{e\bar{\nu}_e} = 12, 12,$$
$$N_{\mu\bar{\nu}_\mu} = 11, 11, \quad N_{\tau\bar{\nu}_\tau} = 10, 10.$$

It was mentioned earlier that Eqs. (20), (40), (41), (43), and (44) represent the masses of left-handed fermions. This allows one to choose only those boson orbits in which there are no right-handed particles. For such a connection we must at first establish an intrastring picture of right-handed antineutrinos.

Their speeds are predicted in Eq. (219) as

$$v_{\bar{\nu}_\epsilon \epsilon pn} < 4.1108353 \cdot 10^{-7} \text{ m/s},$$
$$v_{\bar{\nu}_e e pn} < 1.4912703 \cdot 10^{-6} \text{ m/s},$$
$$v_{\bar{\nu}_\mu \mu pn} < 6.5203866 \cdot 10^{-8} \text{ m/s},$$
$$v_{\bar{\nu}_\tau \tau pn} < 4.2007081 \cdot 10^{-8} \text{ m/s}.$$

The radii (220) lie within the limits

$$r_{\bar{\nu}_\epsilon \epsilon pn} < 2.2845487 \cdot 10^{-31} \text{ m},$$
$$r_{\bar{\nu}_e e pn} < 2.7340753 \cdot 10^{-29} \text{ m},$$
$$r_{\bar{\nu}_\mu \mu pn} < 2.9570621 \cdot 10^{-24} \text{ m},$$
$$r_{\bar{\nu}_\tau \tau pn} < 1.1982383 \cdot 10^{-22} \text{ m}.$$

To any type of antineutrino corresponds in Eq. (221) a kind of period

$$T_{\bar{\nu}_\epsilon \epsilon pn} < 2.4690803 \cdot 10^{-24} \text{ s},$$
$$T_{\bar{\nu}_e e pn} < 1.1519508 \cdot 10^{-23} \text{ s},$$
$$T_{\bar{\nu}_\mu \mu pn} < 2.8494889 \cdot 10^{-16} \text{ s},$$

$$T_{\bar{\nu}_\tau \tau pn} < 1.7922582 \cdot 10^{-14} \text{ s}.$$

The absolute sizes of energies (222) give the estimates

$$E_{\bar{\nu}_\epsilon \epsilon pn} < 4.9738413 \cdot 10^{-7} \text{ eV},$$

$$E_{\bar{\nu}_e epn} < 2.5976213 \cdot 10^{-4} \text{ eV},$$

$$E_{\bar{\nu}_\mu \mu pn} < 1.4281760 \cdot 10^{-5} \text{ eV},$$

$$E_{\bar{\nu}_\tau \tau pn} < 1.2154597 \cdot 10^{-5} \text{ eV}.$$

Having Eqs. (167), (182), and (224) and by following the above orbital structure of the uranium root U_{92}^{184}, for the speeds of left-handed leptonic strings $l\bar{\nu}_l$, we find

$$v_{\epsilon\bar{\nu}_\epsilon pn} = 7.5299171 \cdot 10^{-6} \text{ m/s},$$

$$v_{e\bar{\nu}_e pn} = 2.0555165 \cdot 10^{-7} \text{ m/s},$$

$$v_{\mu\bar{\nu}_\mu pn} = 1.5569310 \cdot 10^{-8} \text{ m/s},$$

$$v_{\tau\bar{\nu}_\tau pn} = 4.1404189 \cdot 10^{-9} \text{ m/s}.$$

Based on Eq. (225), one can also estimate the radii:

$$r_{\epsilon\bar{\nu}_\epsilon pn} = 3.6255062 \cdot 10^{-25} \text{ m},$$

$$r_{e\bar{\nu}_e pn} = 4.8652716 \cdot 10^{-22} \text{ m},$$

$$r_{\mu\bar{\nu}_\mu pn} = 8.4802819 \cdot 10^{-20} \text{ m},$$

$$r_{\tau\bar{\nu}_\tau pn} = 1.1991140 \cdot 10^{-18} \text{ m}.$$

Under such circumstances, the periods (226) are reduced to the numerical data

$$T_{\epsilon\bar{\nu}_\epsilon pn} = 3.0252295 \cdot 10^{-19} \text{ s},$$

$$T_{e\bar{\nu}_e pn} = 1.4871883 \cdot 10^{-14} \text{ s},$$

$$T_{\mu\bar{\nu}_\mu pn} = 3.4223212 \cdot 10^{-11} \text{ s},$$

$$T_{\tau\bar{\nu}_\tau pn} = 1.8196843 \cdot 10^{-9} \text{ s}.$$

The absolute values of energies (227) become equal to

$$E_{\epsilon\bar{\nu}_\epsilon pn} = 8.8858837 \cdot 10^{4} \text{ eV},$$

$$E_{e\bar{\nu}_e pn} = 1.6685178 \text{ eV},$$

$$E_{\mu\bar{\nu}_\mu pn} = 1.3314219 \cdot 10^{-3} \text{ eV},$$

$$E_{\tau\bar{\nu}_\tau pn} = 2.2960163 \cdot 10^{-5} \text{ eV}.$$

One feature of these results is that

$$v_{\bar{\nu}_l lpn} < v_{l\bar{\nu}_l pn}, \quad r_{\bar{\nu}_l lpn} < r_{l\bar{\nu}_l pn}, \tag{229}$$

$$T_{\bar{\nu}_l lpn} < T_{l\bar{\nu}_l pn}, \quad E_{\bar{\nu}_l lpn} < E_{l\bar{\nu}_l pn} \tag{230}$$

are compatible with that between the objects in a solar system.

11. Leptons revolving around a nucleus with an excess neutron or antiproton

For the orbital motion of leptonic strings $l\bar{\nu}_l$, a nucleus pn with zero spin and isospin is not the only intraatomic object with boson orbits. Such orbits can appear even in an atom with a nucleus pnn or pnp, namely, a nucleus with excess neutrons or antiprotons. In the first case, from our earlier analysis, we find a set of atoms $pnnl\bar{\nu}_l\bar{\nu}_l$, around the nuclei of which move not only leptonic strings $l\bar{\nu}_l$ but also antineutrinos $\bar{\nu}_l$ from the leptonic families. The nucleus of an atom $pnpl\bar{\nu}_l l$, for the second case, must have string as well as lepton orbits. In other words, among its orbital particles one can find both bosons $l\bar{\nu}_l$ and leptons l, each of which revolves around it in its own orbit.

In both atoms, as we can expect from the discussion in Sec. X, the quantized orbit sequence of $l\bar{\nu}_l$ cannot change, so that there exists a connection between the atomic systems $pnnl\bar{\nu}_l\bar{\nu}_l$ and $pnpl\bar{\nu}_l l$, and a relation (107) for $pnn\bar{\nu}_l$ and $pnpl$ does not coincide, because of which Eq. (119) holds regardless of the sizes of the variables. Therefore, to use these aspects in the construction of intraatomic structural functions v_{ls}, r_{ls}, T_{ls}, and E_{ls}, for $s = pnp$ (pnn) and $l = l$ $(\bar{\nu}_l)$, one must refer to the substitutions

$$N_n m_n \to m_{pnn}, \quad N_p m_p \to m_{pnp}, \tag{231}$$

because they can generalize the earlier equations (126)-(178) to the case of the investigated types of nuclei with a nonzero spin. For such a choice of objects, Eqs. (151)-(153) define the structure of Eqs. (169)-(173) as follows:

$$v_{\bar{\nu}_l pnn} = \frac{m_{pnn}}{N_{\bar{\nu}_l} m_{\bar{\nu}_l}} \sqrt{\frac{m_{pnp} m_{pnn}}{m_{pl}^2}} c, \tag{232}$$

$$r_{\bar{\nu}_l pnn} = \left(\frac{N_{\bar{\nu}_l} m_{\bar{\nu}_l}}{m_{pnn}}\right)^2 \frac{\hbar}{m_{pnp} c}, \tag{233}$$

$$T_{\bar{\nu}_l pnn} = \frac{2\pi}{c} \left(\frac{N_{\bar{\nu}_l} m_{\bar{\nu}_l}}{m_{pnn}}\right)^3 \sqrt{\frac{m_{pl}^2}{m_{pnp} m_{pnn}}} \frac{\hbar}{m_{pnp} c}, \tag{234}$$

$$E_{\bar{\nu}_l pnn} = -\frac{1}{2} \left(\frac{m_{pnn}}{N_{\bar{\nu}_l} m_{\bar{\nu}_l}}\right)^2 \sqrt{\frac{m_{pnp} m_{pnn}}{m_{pl}^2}} E_{pnn}, \tag{235}$$

$$E_{pnn} = m_{pnn} c^2, \quad m_{pnn} = m_{pn} + (A - 2N_p) m_n, \quad m_{pnp} = m_{pn} + (A - 2N_p) m_p. \tag{236}$$

At the same time, the chosen replacements (231) replace Eqs. (174)-(178) for

$$v_{lpnp} = \frac{m_{pnp}}{N_l m_l} \sqrt{\frac{m_{pnp} m_{pnn}}{m_{pl}^2}} c, \tag{237}$$

$$r_{lpnp} = \left(\frac{N_l m_l}{m_{pnp}}\right)^2 \frac{\hbar}{m_{pnn} c}, \tag{238}$$

$$T_{lpnp} = \frac{2\pi}{c} \left(\frac{N_l m_l}{m_{pnp}}\right)^3 \sqrt{\frac{m_{pl}^2}{m_{pnp} m_{pnn}}} \frac{\hbar}{m_{pnn} c}, \tag{239}$$

$$E_{lpnp} = -\frac{1}{2} \left(\frac{m_{pnp}}{N_l m_l}\right)^2 \sqrt{\frac{m_{pnp} m_{pnn}}{m_{pl}^2}} E_{pnp}, \tag{240}$$

$$E_{pnp} = m_{pnp} c^2. \tag{241}$$

Returning to the orbital structure of the U_{92}^{238} atom in Sec. III, we remark that jointly with masses (20), (40), (41), (43), and (44), the solution (232) predicts the speeds of right-handed antineutrinos:

$$v_{\bar{\nu}_\epsilon pnn} < 1.0564742 \cdot 10^6 \text{ m/s},$$

$$v_{\bar{\nu}_e pnn} < 7.0078241 \cdot 10^{-1} \text{ m/s},$$

$$v_{\bar{\nu}_\mu pnn} < 1.2023227 \cdot 10^{-3} \text{ m/s},$$

$$v_{\bar{\nu}_\tau pnn} < 1.1230487 \cdot 10^{-5} \text{ m/s}.$$

The radii (233) of their orbits have the restrictions

$$r_{\bar{\nu}_\epsilon pnn} < 2.3826388 \cdot 10^{-47} \text{ m},$$

$$r_{\bar{\nu}_e pnn} < 5.4151396 \cdot 10^{-39} \text{ m},$$

$$r_{\bar{\nu}_\mu pnn} < 1.8396445 \cdot 10^{-29} \text{ m},$$

$$r_{\bar{\nu}_\tau pnn} < 2.1085254 \cdot 10^{-25} \text{ m}.$$

In these orbits, the periods (234) behave as

$$T_{\bar{\nu}_\epsilon pnn} < 1.4170303 \cdot 10^{-59} \text{ s},$$

$$T_{\bar{\nu}_e pnn} < 4.8551911 \cdot 10^{-40} \text{ s},$$

$$T_{\bar{\nu}_\mu pnn} < 9.6137473 \cdot 10^{-26} \text{ s},$$

$$T_{\bar{\nu}_\tau pnn} < 1.1796688 \cdot 10^{-19} \text{ s}.$$

The absolute energies from Eq. (235) one can reduce to

$$E_{\bar{\nu}_\epsilon pnn} < 7.5816144 \cdot 10^{22} \text{ eV},$$

$$E_{\bar{\nu}_e pnn} < 3.3358787 \cdot 10^{14} \text{ eV},$$

$$E_{\bar{\nu}_\mu pnn} < 9.8194238 \cdot 10^{4} \text{ eV},$$

$$E_{\bar{\nu}_\tau pnn} < 8.5672427 \text{ eV}.$$

A comparison of these values with estimates (169)-(172) for the Fn_{92}^{92} atom from the uranium family convinces us once again of the existence of inequalities:

$$v_{\bar{\nu}_l n} < v_{\bar{\nu}_l pnn}, \quad r_{\bar{\nu}_l n} > r_{\bar{\nu}_l pnn}, \tag{242}$$

$$T_{\bar{\nu}_l n} > T_{\bar{\nu}_l pnn}, \quad E_{\bar{\nu}_l n} < E_{\bar{\nu}_l pnn}. \tag{243}$$

Such an implication can be made by investigating the orbital structure of uranium

$$U_{92}^{130} \to O_\epsilon^L, \;\; O_\epsilon^R, \;\; O_e^L, \;\; O_e^R, \;\; O_\mu^L, \;\; O_\mu^R, \;\; O_\tau^L, \;\; O_\tau^R, \;\; O_{\epsilon\bar{\nu}_\epsilon}^L, \;\; O_{\epsilon\bar{\nu}_\epsilon}^R, \;\; O_{e\bar{\nu}_e}^L, \;\; O_{e\bar{\nu}_e}^R,$$

$$O_{\mu\bar{\nu}_\mu}^L, \;\; O_{\mu\bar{\nu}_\mu}^R, \;\; O_{\tau\bar{\nu}_\tau}^L, \;\; O_{\tau\bar{\nu}_\tau}^R \to N_\epsilon^o = 1, 2, \quad N_e^o = 3, 4 \quad N_\mu^o = 5, 6, \quad N_\tau^o = 7, 8,$$

$$N_{\epsilon\bar{\nu}_\epsilon}^o = 9, 10, \quad N_{e\bar{\nu}_e}^o = 11, 12, \quad N_{\mu\bar{\nu}_\mu}^o = 13, 14, \quad N_{\tau\bar{\nu}_\tau}^o = 15, 16 \to N_\epsilon = 8, 8,$$

$$N_e = 7, 7, \quad N_\mu = 6, 6, \quad N_\tau = 6, 6, \quad N_{\epsilon\bar{\nu}_\epsilon} = 6, 6,$$

$$N_{e\bar{\nu}_e} = 5, 5, \quad N_{\mu\bar{\nu}_\mu} = 4, 4, \quad N_{\tau\bar{\nu}_\tau} = 4, 4,$$

which has both lepton and string orbits.

The function (237), together with Eqs. (14), (38), (39), (43), and (44), defines the speeds of leptons in orbits of an odd ($N_l^o = 1, 3, 5, 7$) order

$$v_{\epsilon pnp} = 1.4090116 \cdot 10^{-1} \text{ m/s},$$

$$v_{epnp} = 1.0224542 \cdot 10^{-4} \text{ m/s},$$

$$v_{\mu pnp} = 5.7690824 \cdot 10^{-7} \text{ m/s},$$

$$v_{\tau pnp} = 3.4302491 \cdot 10^{-8} \text{ m/s}.$$

In a given case, from Eq. (238), we find the radii

$$r_{\epsilon pnp} = 7.3134310 \cdot 10^{-34} \text{ m},$$

$$r_{epnp} = 1.3888731 \cdot 10^{-27} \text{ m},$$

$$r_{\mu pnp} = 4.3625140 \cdot 10^{-23} \text{ m},$$

$$r_{\tau pnp} = 1.2339540 \cdot 10^{-19} \text{ m}.$$

The periods (239) thus have the values

$$T_{\epsilon pnp} = 1.3045071 \cdot 10^{-31} \text{ s},$$

$$T_{epnp} = 8.5349025 \cdot 10^{-23} \text{ s},$$

$$T_{\mu pnp} = 4.7512727 \cdot 10^{-16} \text{ s},$$

$$T_{\tau pnp} = 2.2602329 \cdot 10^{-12} \text{ s}.$$

According to (240), the absolute energies are equal to

$$E_{\epsilon pnp} = 1.3479720 \cdot 10^{9} \text{ eV},$$

$$E_{epnp} = 7.0980572 \cdot 10^{2} \text{ eV},$$

$$E_{\mu pnp} = 2.2597751 \cdot 10^{-2} \text{ eV},$$

$$E_{\tau pnp} = 7.9891959 \cdot 10^{-5} \text{ eV}.$$

These sizes and the estimates that follow from Eqs. (174)-(177) for the uranium isotope U_{92}^{92} from its family satisfy the conditions

$$v_{lp} < v_{lpnp}, \quad r_{lp} > r_{lpnp}, \tag{244}$$

$$T_{ep} > T_{lpnp}, \quad E_{lp} < E_{lpnp}. \tag{245}$$

Similarly to ratios (242) and (243), they simply reflect the fact that each of the existing types of nuclei constitutes a kind of atomic system.

12. Leptonic strings in atoms with nuclei with excess neutrons

According to the preceding analysis, the general picture of atomic systems essentially depends on the isotopic structure of the nucleus.

To express this idea more clearly, one needs use the substitution

$$m_{pn} \to m_{pnn} \tag{246}$$

in Eqs. (180)-(227) for systems of the $pnnl\bar{\nu}_l$ and $l\bar{\nu}_l$ types as a unity of flavor and baryon symmetry laws. This simply replaces Eqs. (219)-(222) with

$$v_{\bar{\nu}_l lpnn} = \frac{m_l}{m_{\bar{\nu}_l}}\sqrt{\frac{m_{pnn}m_l}{m_{pl}^2}}c, \tag{247}$$

$$r_{\bar{\nu}_l lpnn} = \left(\frac{m_{\bar{\nu}_l}}{m_l}\right)^2 \frac{\hbar}{m_{pnn}c}, \tag{248}$$

$$T_{\bar{\nu}_l lpnn} = \frac{2\pi}{c}\left(\frac{m_{\bar{\nu}_l}}{m_l}\right)^3 \sqrt{\frac{m_{pl}^2}{m_{pnn}m_l}}\frac{\hbar}{m_{pnn}c}, \tag{249}$$

$$E_{\bar{\nu}_l lpnn} = -\frac{1}{2}\left(\frac{m_l}{m_{\bar{\nu}_l}}\right)^2 \sqrt{\frac{m_{pnn}m_l}{m_{pl}^2}}E_l. \tag{250}$$

The account of the chosen transformation (246) gives the opportunity for a transition from Eqs. (224)-(227) into

$$v_{l\bar{\nu}_l pnn} = \frac{m_{pnn}}{N_{l\bar{\nu}_l}m_{l\bar{\nu}_l}}\sqrt{\frac{m_{pnn}m_l}{m_{pl}^2}}c, \tag{251}$$

$$r_{l\bar{\nu}_l pnn} = \left(\frac{N_{l\bar{\nu}_l}m_{l\bar{\nu}_l}}{m_{pnn}}\right)^2 \frac{\hbar}{m_l c}, \tag{252}$$

$$T_{l\bar{\nu}_l pnn} = \frac{2\pi}{c}\left(\frac{N_{l\bar{\nu}_l}m_{l\bar{\nu}_l}}{m_{pnn}}\right)^3 \sqrt{\frac{m_{pl}^2}{m_{pnn}m_l}}\frac{\hbar}{m_l c}, \tag{253}$$

$$E_{l\bar{\nu}_l pnn} = -\frac{1}{2}\left(\frac{m_{pnn}}{N_{l\bar{\nu}_l}m_{l\bar{\nu}_l}}\right)^2 \sqrt{\frac{m_{pnn}m_l}{m_{pl}^2}}E_{pnn}. \tag{254}$$

Therefore, if one starts from the orbital structure of the uranium isotope U_{92}^{238} and then performs explicit evaluations, one can establish quantitative restrictions on the intrastring functions (247)-(250) for antineutrinos of left-handed strings.

The speeds (247) come forward in them as

$$v_{\bar{\nu}_\epsilon \epsilon pnn} < 4.6756670 \cdot 10^{-7} \text{ m/s},$$

$$v_{\bar{\nu}_e epnn} < 1.6961719 \cdot 10^{-6} \text{ m/s},$$

$$v_{\bar{\nu}_\mu \mu pnn} < 7.4162924 \cdot 10^{-8} \text{ m/s},$$

$$v_{\bar{\nu}_\tau \tau pnn} < 4.7778884 \cdot 10^{-8} \text{ m/s}.$$

To any type of speed corresponds in Eq. (248) a kind of radius

$$r_{\bar{\nu}_\epsilon \epsilon pnn} < 1.7659297 \cdot 10^{-31} \text{ m},$$

$$r_{\bar{\nu}_e epnn} < 2.1134086 \cdot 10^{-29} \text{ m},$$

$$r_{\bar{\nu}_\mu \mu pnn} < 2.2857749 \cdot 10^{-24} \text{ m},$$

$$r_{\bar{\nu}_\tau \tau pnn} < 9.2622443 \cdot 10^{-23} \text{ m}.$$

The periods (249) are restricted by the sizes

$$T_{\bar{\nu}_\epsilon \epsilon pnn} < 1.6780106 \cdot 10^{-24} \text{ s},$$

$$T_{\bar{\nu}_e epnn} < 7.8287687 \cdot 10^{-23} \text{ s},$$
$$T_{\bar{\nu}_\mu \mu pnn} < 1.9365400 \cdot 10^{-16} \text{ s},$$
$$T_{\bar{\nu}_\tau \tau pnn} < 1.2180359 \cdot 10^{-14} \text{ s}.$$

An analysis of the absolute energies (250) assumes that

$$E_{\bar{\nu}_\epsilon \epsilon pnn} < 5.6572506 \cdot 10^{-7} \text{ eV},$$
$$E_{\bar{\nu}_e epnn} < 5.9090728 \cdot 10^{-4} \text{ eV},$$
$$E_{\bar{\nu}_\mu \mu pnn} < 1.6244084 \cdot 10^{-2} \text{ eV},$$
$$E_{\bar{\nu}_\tau \tau pnn} < 2.7649296 \cdot 10^{-2} \text{ eV}.$$

As their comparison with the estimates implied from Eqs. (219)-(222) for the uranium root U_{92}^{184}, only part of the general picture is obtained:

$$v_{\bar{\nu}_l lpn} < v_{\bar{\nu}_l lpnn}, \quad r_{\bar{\nu}_l lpn} > r_{\bar{\nu}_l lpnn}, \tag{255}$$

$$T_{\bar{\nu}_l lpn} > T_{\bar{\nu}_l lpnn}, \quad E_{\bar{\nu}_l lpn} < E_{\bar{\nu}_l lpnn}. \tag{256}$$

Insofar as the behavior of $l\bar{\nu}_l$ in the U_{92}^{238} atom is concerned, the speeds (251) for the odd ($N_{l\bar{\nu}_l}^o = 9, 11, 13, 15$) order of orbits of leptonic strings have the values

$$v_{\epsilon\bar{\nu}_\epsilon pnn} = 1.1079768 \cdot 10^{-5} \text{ m/s},$$
$$v_{e\bar{\nu}_e pnn} = 3.0245549 \cdot 10^{-7} \text{ m/s},$$
$$v_{\mu\bar{\nu}_\mu pnn} = 2.2909197 \cdot 10^{-8} \text{ m/s},$$
$$v_{\tau\bar{\nu}_\tau pnn} = 6.0923491 \cdot 10^{-9} \text{ m/s}.$$

One can also estimate the radii (252) that

$$r_{\epsilon\bar{\nu}_\epsilon pnn} = 2.1662803 \cdot 10^{-25} \text{ m},$$
$$r_{e\bar{\nu}_e pnn} = 2.9070540 \cdot 10^{-22} \text{ m},$$
$$r_{\mu\bar{\nu}_\mu pnn} = 5.0670629 \cdot 10^{-20} \text{ m},$$
$$r_{\tau\bar{\nu}_\tau pnn} = 7.1648398 \cdot 10^{-19} \text{ m}.$$

To such speeds and radii apply the periods (253), which are equal to

$$T_{\epsilon\bar{\nu}_\epsilon pnn} = 1.2284679 \cdot 10^{-19} \text{ s},$$
$$T_{e\bar{\nu}_e pnn} = 6.0390899 \cdot 10^{-15} \text{ s},$$
$$T_{\mu\bar{\nu}_\mu pnn} = 1.3897167 \cdot 10^{-11} \text{ s},$$
$$T_{\tau\bar{\nu}_\tau pnn} = 7.3892705 \cdot 10^{-10} \text{ s}.$$

They are of course the consequences of energies (254) with the following absolute values:

$$E_{\epsilon\bar{\nu}_\epsilon pnn} = 2.1882407 \cdot 10^{5} \text{ eV},$$
$$E_{e\bar{\nu}_e pnn} = 4.1088979 \text{ eV},$$
$$E_{\mu\bar{\nu}_\mu pnn} = 1.6393821 \cdot 10^{-3} \text{ eV},$$

$$E_{\tau\bar{\nu}_\tau pnn} = 2.8270889 \cdot 10^{-5} \text{ eV}.$$

If we now compare these sizes with those that follow from Eqs. (224)-(227) for the uranium root U_{92}^{184}, which has neither spin nor isospin, we see that

$$v_{l\bar{\nu}_l pn} < v_{l\bar{\nu}_l pnn}, \quad r_{l\bar{\nu}_l pn} > r_{l\bar{\nu}_l pnn}, \tag{257}$$

$$T_{l\bar{\nu}_l pn} > T_{l\bar{\nu}_l pnn}, \quad E_{l\bar{\nu}_l pn} < E_{l\bar{\nu}_l pnn}. \tag{258}$$

As in ratios (229) and (230), the estimates found here lead to the inequalities

$$v_{\bar{\nu}_l lpnn} < v_{l\bar{\nu}_l pnn}, \quad r_{\bar{\nu}_l lpnn} < r_{l\bar{\nu}_l pnn}, \tag{259}$$

$$T_{\bar{\nu}_l lpnn} < T_{l\bar{\nu}_l pnn}, \quad E_{\bar{\nu}_l lpnn} < E_{l\bar{\nu}_l pnn}, \tag{260}$$

which do not depend on the spin or isospin structure of the atomic nucleus.

13. Orbital strings of atoms with nuclei with excess antiprotons

It is particularly important to note that although inequalities such as (229), (230), (259), and (260) exist between the Earth, Moon, and Sun, the possibility of their existence in an atom does not prevent the general picture of such systems from also exhibiting an explicit dependence on the spin and isospin of the nucleus. To solve this question from the point of view of an excess antiproton, one must choose a substitution

$$m_{pn} \to m_{pnp} \tag{261}$$

to establish the nature of systems of the $pnpl\bar{\nu}_l$ and $l\bar{\nu}_l$ types, generalizing Eqs. (180)-(227) to the case of such atoms. Of course, Eqs. (219)-(222) here have the following structure:

$$v_{\bar{\nu}_l lpnp} = \frac{m_l}{m_{\bar{\nu}_l}} \sqrt{\frac{m_{pnp} m_l}{m_{pl}^2}} c, \tag{262}$$

$$r_{\bar{\nu}_l lpnp} = \left(\frac{m_{\bar{\nu}_l}}{m_l}\right)^2 \frac{\hbar}{m_{pnp} c}, \tag{263}$$

$$T_{\bar{\nu}_l lpnp} = \frac{2\pi}{c} \left(\frac{m_{\bar{\nu}_l}}{m_l}\right)^3 \sqrt{\frac{m_{pl}^2}{m_{pnp} m_l} \frac{\hbar}{m_{pnp} c}}, \tag{264}$$

$$E_{\bar{\nu}_l lpnp} = -\frac{1}{2} \left(\frac{m_l}{m_{\bar{\nu}_l}}\right)^2 \sqrt{\frac{m_{pnp} m_l}{m_{pl}^2}} E_l. \tag{265}$$

These intrastring connections are carried out in atoms of the $pnpl\bar{\nu}_l$ types, for which the condition (261) generalizes the structural functions (224)-(227), converting them into the following forms:

$$v_{l\bar{\nu}_l pnp} = \frac{m_{pnp}}{N_{l\bar{\nu}_l} m_{l\bar{\nu}_l}} \sqrt{\frac{m_{pnp} m_l}{m_{pl}^2}} c, \tag{266}$$

$$r_{l\bar{\nu}_l pnp} = \left(\frac{N_{l\bar{\nu}_l} m_{l\bar{\nu}_l}}{m_{pnp}}\right)^2 \frac{\hbar}{m_l c}, \tag{267}$$

$$T_{l\bar{\nu}_l pnp} = \frac{2\pi}{c} \left(\frac{N_{l\bar{\nu}_l} m_{l\bar{\nu}_l}}{m_{pnp}}\right)^3 \sqrt{\frac{m_{pl}^2}{m_{pnp} m_l} \frac{\hbar}{m_l c}}, \tag{268}$$

$$E_{l\bar{\nu}_l pnp} = -\frac{1}{2}\left(\frac{m_{pnp}}{N_{l\bar{\nu}_l} m_{l\bar{\nu}_l}}\right)^2 \sqrt{\frac{m_{pnp} m_l}{m_{pl}^2}} E_{pnp}. \tag{269}$$

We will now perform, on the basis of Eqs. (262)-(269), the explicit evaluations referring to intraatomic left-handed objects in the uranium isotope U_{92}^{130}, the orbital structure of which is given in Sec. XI. This requires one to follow the logic of the nature of leptonic strings $l\bar{\nu}_l$ in orbits of odd ($N_{l\bar{\nu}_l}^o = 9, 11, 13, 15$) orders. From Eq. (262), one can define upper limits on the intrastring speeds of right-handed antineutrinos

$$v_{\bar{\nu}_\epsilon \epsilon pnp} < 3.4548620 \cdot 10^{-7} \text{ m/s},$$

$$v_{\bar{\nu}_e e pnp} < 1.2533056 \cdot 10^{-6} \text{ m/s},$$

$$v_{\bar{\nu}_\mu \mu pnp} < 5.4799170 \cdot 10^{-8} \text{ m/s},$$

$$v_{\bar{\nu}_\tau \tau pnp} < 3.5303936 \cdot 10^{-8} \text{ m/s}.$$

With the aid of Eq. (263), we find the radii of their orbits:

$$r_{\bar{\nu}_\epsilon \epsilon pnp} < 3.2344404 \cdot 10^{-31} \text{ m},$$

$$r_{\bar{\nu}_e e pnp} < 3.8708755 \cdot 10^{-29} \text{ m},$$

$$r_{\bar{\nu}_\mu \mu pnp} < 4.1865780 \cdot 10^{-24} \text{ m},$$

$$r_{\bar{\nu}_\tau \tau pnp} < 1.6964535 \cdot 10^{-22} \text{ m}.$$

The intrastring periods, as found from (264), have the limits

$$T_{\bar{\nu}_\epsilon \epsilon pnp} < 5.8823155 \cdot 10^{-24} \text{ s},$$

$$T_{\bar{\nu}_e e pnp} < 1.9405822 \cdot 10^{-22} \text{ s},$$

$$T_{\bar{\nu}_\mu \mu pnp} < 4.8002635 \cdot 10^{-16} \text{ s},$$

$$T_{\bar{\nu}_\tau \tau pnp} < 3.0192473 \cdot 10^{-14} \text{ s}.$$

One can see from (265) that the absolute energies satisfy

$$E_{\bar{\nu}_\epsilon \epsilon pnp} < 2.0900783 \cdot 10^{-7} \text{ eV},$$

$$E_{\bar{\nu}_e e pnp} < 4.3662286 \cdot 10^{-4} \text{ eV},$$

$$E_{\bar{\nu}_\mu \mu pnp} < 1.2002794 \cdot 10^{-5} \text{ eV},$$

$$E_{\bar{\nu}_\tau \tau pnp} < 2.0430134 \cdot 10^{-5} \text{ eV}.$$

Now, we look at the upper limits obtained in Eqs. (219)-(222) for U_{92}^{184}, which, jointly with the foregoing, show that

$$v_{\bar{\nu}_l lpn} < v_{\bar{\nu}_l lpnp}, \quad r_{\bar{\nu}_l lpn} > r_{\bar{\nu}_l lpnp}, \tag{270}$$

$$T_{\bar{\nu}_l lpn} > T_{\bar{\nu}_l lpnp}, \quad E_{\bar{\nu}_l lpn} < E_{\bar{\nu}_l lpnp}. \tag{271}$$

As in the uranium root U_{92}^{184} and its isotope U_{92}^{238}, each leptonic boson $l\bar{\nu}_l$ in U_{92}^{130} must distinguish itself from the others by the values of Eqs. (266)-(269), according to which $v_{l\bar{\nu}_l pnp}$ coincides with speeds of

$$v_{\epsilon\bar{\nu}_\epsilon pnp} = 1.9369311 \cdot 10^{-5} \text{ m/s},$$

$$v_{e\bar{\nu}_e pnp} = 2.9284250 \cdot 10^{-7} \text{ m/s},$$

$$v_{\mu\bar{\nu}_\mu pnp} = 2.5415811 \cdot 10^{-8} \text{ m/s},$$

$$v_{\tau\bar{\nu}_\tau pnp} = 6.1444950 \cdot 10^{-9} \text{ m/s}.$$

For these speeds, an analysis of the radii $r_{l\bar{\nu}_l pnp}$ indicates that

$$r_{\epsilon\bar{\nu}_\epsilon pnp} = 1.5480391 \cdot 10^{-25} \text{ m},$$

$$r_{e\bar{\nu}_e pnp} = 1.6309793 \cdot 10^{-22} \text{ m},$$

$$r_{\mu\bar{\nu}_\mu pnp} = 2.2477208 \cdot 10^{-20} \text{ m},$$

$$r_{\tau\bar{\nu}_\tau pnp} = 3.8457223 \cdot 10^{-19} \text{ m}.$$

Based on these speeds and radii, one can estimate the periods $T_{l\bar{\nu}_l pnp}$ and find that

$$T_{\epsilon\bar{\nu}_\epsilon pnp} = 5.0216634 \cdot 10^{-20} \text{ s},$$

$$T_{e\bar{\nu}_e pnp} = 3.6326857 \cdot 10^{-15} \text{ s},$$

$$T_{\mu\bar{\nu}_\mu pnp} = 5.5567169 \cdot 10^{-12} \text{ s},$$

$$T_{\tau\bar{\nu}_\tau pnp} = 3.9325259 \cdot 10^{-10} \text{ s}.$$

To them, we must only add that the absolute energies $E_{l\bar{\nu}_l pnp}$ are equal to

$$E_{\epsilon\bar{\nu}_\epsilon pnp} = 1.2353478 \cdot 10^{5} \text{ eV},$$

$$E_{e\bar{\nu}_e pnp} = 2.8461499 \text{ eV},$$

$$E_{\mu\bar{\nu}_\mu pnp} = 1.4909240 \cdot 10^{-3} \text{ eV},$$

$$E_{\tau\bar{\nu}_\tau pnp} = 2.1248556 \cdot 10^{-5} \text{ eV}.$$

It is also relevant to compare these estimates with those found in (224)-(227) for U_{92}^{184} with the same choice of particle mass. This allows one to establish the following inequalities:

$$v_{l\bar{\nu}_l pn} < v_{l\bar{\nu}_l pnp}, \quad r_{l\bar{\nu}_l pn} > r_{l\bar{\nu}_l pnp}, \tag{272}$$

$$T_{l\bar{\nu}_l pn} > T_{l\bar{\nu}_l pnp}, \quad E_{l\bar{\nu}_l pn} < E_{l\bar{\nu}_l pnp}. \tag{273}$$

Their existence, similarly to ratios (270) and (271), will testify in favor of a role of excess antiprotons, and

$$v_{\bar{\nu}_l lpnp} < v_{l\bar{\nu}_l pnp}, \quad r_{\bar{\nu}_l lpnp} < r_{l\bar{\nu}_l pnp}, \tag{274}$$

$$T_{\bar{\nu}_l lpnp} < T_{l\bar{\nu}_l pnp}, \quad E_{\bar{\nu}_l lpnp} < E_{l\bar{\nu}_l pnp} \tag{275}$$

hold regardless of the spin or isospin of the atomic nucleus.

14. Orbit quantization law

We have established the validity of one more highly important theorem of atomic unification. One can formulate and prove again it.

Theorem 3. If an intrasystem feature of the two types of symmetries, namely, the flavor and baryon symmetries, is their simultaneous violation, their coexistence or both, a force of grand system unification becomes latently quantized.

Thus, although from our previous analyses it follows the validity of this theorem, we can present here its proof as some remarks.

Owing to the quantum nature of atomic systems, to any type of left (right)-handed orbit of an odd (even) order corresponds a kind of radius. This principle expresses, in the case of Fn_{92}^{92}, the idea of antineutrino orbits of an odd order that

$$r_{\bar{\nu}_{\epsilon}n} < r_{\bar{\nu}_{e}n} < r_{\bar{\nu}_{\mu}n} < r_{\bar{\nu}_{\tau}n}. \tag{276}$$

This correspondence does not change even for atomic systems with nuclei made of antiprotons. An example is the uranium isotope U_{92}^{92} in which the radii of lepton orbits of an odd order constitute the quantized sequence

$$r_{\epsilon p} < r_{ep} < r_{\mu p} < r_{\tau p}. \tag{277}$$

If we now recall that the formation of U_{92}^{184} through the interaction (179) between Fn_{92}^{92} and U_{92}^{92} is not forbidden by unification laws, then from the point of view of each of them, it should be expected that the united regularity

$$r_{\epsilon\bar{\nu}_{\epsilon}pn} < r_{e\bar{\nu}_{e}pn} < r_{\mu\bar{\nu}_{\mu}pn} < r_{\tau\bar{\nu}_{\tau}pn} \tag{278}$$

will appear in U_{92}^{184} in the presence of its boson orbits of an odd order.

At first sight, the difference in masses m_l and $m_{\bar{\nu}_l}$, in the case of an atom U_{92}^{238}, violates the orbit quantized sequence principle. On the other hand, our orbital analysis shows that

$$r_{\bar{\nu}_{\epsilon}pnn} < r_{\bar{\nu}_{e}pnn} < r_{\bar{\nu}_{\mu}pnn} < r_{\bar{\nu}_{\tau}pnn}, \quad r_{\epsilon\bar{\nu}_{\epsilon}pnn} < r_{e\bar{\nu}_{e}pnn} < r_{\mu\bar{\nu}_{\mu}pnn} < r_{\tau\bar{\nu}_{\tau}pnn}. \tag{279}$$

Finally, insofar as the uranium isotope U_{92}^{130} is concerned, we have already seen that

$$r_{\epsilon pnp} < r_{epnp} < r_{\mu pnp} < r_{\tau pnp}, \quad r_{\epsilon\bar{\nu}_{\epsilon}pnp} < r_{e\bar{\nu}_{e}pnp} < r_{\mu\bar{\nu}_{\mu}pnp} < r_{\tau\bar{\nu}_{\tau}pnp}. \tag{280}$$

Therefore, it is relevant to emphasize once more that neither of the orbital particles in atomic system contradicts the symmetry laws. In other words, the atom has been created so that to any type of orbit corresponds a kind of size of the radius of action of an intraatomic unified force. At these situations, a force of atomic unification becomes latently quantized. Thus, orbit quantization cannot carry out around a nucleus independently of a family structure of leptons. On this basis, nature itself has quantized an intraatomic united force acting between the nucleus and its orbital objects with a flavor type dependence.

15. Conclusion

An intraatomic feature of the two types of symmetries, namely, the flavor and baryon symmetries, is their simultaneous violation, their coexistence or both. In the first case, the atom has a nucleus consisting of neutrons or antiprotons. Atomic systems with nuclei of the same quantity of neutrons and antiprotons refer to the second case. An example of the third case is the atom with a nucleus with an excess neutron or antiproton.

An important characteristic of a general picture of these atomic systems is that their construction is based at first on the existence in nature of Fn_1^1 and H_1^1 given summed baryon and lepton number conservation. Thus, if a force of atomic unification relates the flavor and baryon symmetries as a consequence of the neutrality of an atom, then the formation of an orbit quantized sequence around a nucleus must be considered as an orbital quantization of not only a force but also each mass and charge.

It is already clear from these connections that orbit quantization of any atomic system unites all intraatomic symmetry laws in a unified whole. This reflects a crucial role of Fn_1^1

and H_1^1 in the construction of each of the remaining forms of atoms. Therefore, it is important to elucidate what is the radius of their single orbit including the speed, absolute energy, and revolution period of its corresponding particle. For this, first of all, one must mention the sizes of the functions (169)-(172), which, at $N_n = N_{\bar{\nu}_\epsilon}$, have the following limits:

$$v_{\bar{\nu}_\epsilon n} < 1.4928839 \cdot 10^2 \text{ m/s},$$

$$r_{\bar{\nu}_\epsilon n} < 5.0162382 \cdot 10^{-42} \text{ m},$$

$$T_{\bar{\nu}_\epsilon n} < 2.1112126 \cdot 10^{-43} \text{ s},$$

$$E_{\bar{\nu}_\epsilon n} < 1.5147019 \cdot 10^{15} \text{ eV}.$$

Supposing in Eqs. (174)-(177) that $N_p = N_\epsilon$, we find for their explicit values

$$v_{\epsilon p} = 6.6671897 \cdot 10^{-5} \text{ m/s},$$

$$r_{\epsilon p} = 2.5115763 \cdot 10^{-29} \text{ m},$$

$$T_{\epsilon p} = 2.3669191 \cdot 10^{-24} \text{ s},$$

$$E_{\epsilon p} = 3.0169111 \cdot 10^2 \text{ eV}.$$

These findings require to recall the presence in Eqs. (169)-(172) and (232)-(235) of the mass and number of protons and the presence in Eqs. (174)-(177) and (237)-(240) of the mass and number of antineutrons, describing the fact that all structural sizes in general for atomic systems $Fn_N^A(\bar{F}n_N^A)$ and $\bar{X}_Z^A(X_Z^A)$ are responsible for their periodic interconversions in which there again appear both a compatibility of the functional connections (126), (130), (141), (146), (181), (186), (196), and (201) with symmetry laws and an incompatibility of these connections with transitions

$$Fn_N^A \leftrightarrow \bar{F}n_N^A, \quad X_Z^A \leftrightarrow \bar{X}_Z^A. \tag{281}$$

We now remark that comparatively recent laboratory data confirm the existence of 15 more new forms of atoms, extending the sequences (95) and (96) to

$$9, \quad 18, \quad 27, \quad ..., \quad 927, \quad ..., \quad 1062, \quad ..., \tag{282}$$

$$1, \quad 2, \quad 3, ..., \quad 103, \quad ..., \quad 118, \quad .... \tag{283}$$

Then it is possible, from the sum of the first 118 terms of the progression (282), to predict the availability in nature of 63189 isotope forms of 118 types of atomic systems.

Among these objects, the uranium family includes 828 types of atoms. Of them U_{92}^{236} is formed, similarly to all other uranium isotopes with excess neutrons, through atomic unification

$$Fn_1^1 + U_{92}^{235} \rightarrow U_{92}^{236}. \tag{284}$$

Its decay is carried out by a principle that

$$U_{92}^{236} \rightarrow Kr_{36}^{92} + Ba_{56}^{141} + Fn_3^3. \tag{285}$$

It is here that we must, for the first time, use the energy of atomic origination, emphasizing that it comes forward at first as an isotropic flux of the same antineutrino hydrogens Fn_1^1 from the decay of the Fn_3^3 atom of the lithium family

$$Fn_3^3 \rightarrow Fn_1^1 + Fn_1^1 + Fn_1^1, \tag{286}$$

and, next, as an anisotropic flux of the two types of objects from the decay

$$Fn_1^1 \to \bar{\nu}_{\epsilon L,R} + n_{L,R}^-. \tag{287}$$

After the transition (285), this is becoming a powerful tool for new measurements owing to the full energy of an antineutrino depending on a force of atomic unification that has formed the atom Fn_1^1 in which antineutrino itself was in orbit around a nucleus.

If, despite these connections, the spontaneous structural changes of uranium U_{92}^{236} have successively constituted either type of flux, this implies simply that each antineutrino is trying to show us something nonsimple that nothing prevents the possibility in an incoming astronomical object of such an energy that was strictly latent in its first-initial (now lost) orbit.

Thus, the previously described orbital antineutrinos reflect a part of a general picture of the universe in which it is predicted that the formation of solar systems is based on the construction of atomic systems, not vice versa.

The similarities and differences in nature of these two forms of the same object will be expounded upon in our further works. However, here we have already mentioned that a solar system was initially an atomic one.

References

1. E. Rutherford, Phil. Mag. **21,** 669 (1911).
2. R.S. Sharafiddinov, Spacetime Subst. **3**, 47 (2002); Bull. Am. Phys. Soc. **59,** T1.00009 (2014); e-print arXiv:physics/0305008.
3. R.S. Sharafiddinov, Bull. Am. Phys. Soc. **60**, E13.00008 (2015); e-print arXiv:hep-ph/0409254.
4. N. Bohr, Phil. Mag. **26**, 1 (1913).
5. J. Stark, Ann. Phys. **43**, 965 (1914).
6. P. Zeeman, *Researches in Magneto-optics* (London, 1913).
7. O. Klein, Nature **161**, 897 (1948).
8. E. Clementel and G. Puppi, Nuovo Cimento **5**, 505 (1948).
9. J. Tiomno and J. Wheeler, Rev. Mod. Phys. **21**, 144 (1949).
10. T.D. Lee, M.H. Rosenbluth and C.N. Yang, Phys. Rev. **75**, 905 (1949).
11. R.S. Sharafiddinov, Eur. Phys. J. Plus **126**, 40 (2011); e-print arXiv:0802.3736 [physics.gen-ph].
12. Ya.B. Zel'dovich. Dokl. Akad. Nauk SSSR. **91**, 1317 (1953).
13. E.J. Konopinski and H. Mahmoud. Phys. Rev. **92**, 1045 (1953).
14. R.S. Sharafiddinov, Phys. Essays **30**, 150 (2017); Bull. Am. Phys. Soc. **59**, Y12.00006 (2014); e-print arXiv:1203.3987 [physics.gen-ph].
15. R.S. Sharafiddinov, Can. J. Phys. **92**, 1262 (2014); Bull. Am. Phys. Soc. **57**, MB.00003 (2012); e-print arXiv:0807.3805 [physics.gen-ph].

16. G.G. Raffelt, Phys. Rep. **320**, 319 (1999).

17. R.S. Sharafiddinov, Int. J. Theor. Phys. **55**, 3040 (2016); Bull. Am. Phys. Soc. **57**, KA.00069 (2012); e-print arXiv:1004.0997 [hep-ph].

18. R.S. Sharafiddinov, Proceedings of the April Meeting of the American Physical Society, Dallas, Texas, April 22-25, 2006, Abstract, H12.00009; e-print arXiv:hep-ph/0511065.

19. Ya.B. Zel'dovich, Dokl. Akad. Nauk SSSR. **86**, 505 (1952).

20. Particle Data Group, *Review of Particle Properties*, Phys. Rev. **D 45** (1992).

21. R.S. Sharafiddinov, Can. J. Phys. **93**, 1005 (2015); Bull. Am. Phys. Soc. **59**, EC.00001 (2014); e-print arXiv:1409.2397 [physics.gen-ph].

22. M. Goldhaber, L. Grodzins and A.W. Sunyar, Phys. Rev. **106**, 826 (1957).

23. M. Goldhaber, L. Grodzins and A.W. Sunyar, Phys. Rev. **109**, 1015 (1958).

24. H. Überall, Nuovo Cimento **6**, 376 (1957).

25. R.S. Sharafiddinov, Phys. Essays **29**, 410 (2016); Bull. Am. Phys. Soc. **59**, EC.00007 (2014); e-print arXiv:1703.06030 [physics.gen-ph].

26. G. Audi, O. Bersillon, J. Blachot and A. H. Wapstra, Nucl. Phys. **A 729**, 3 (2003).

27. G. Audi, A.H. Wapstra, and C. Thibault, Nucl. Phys. **A 729**, 337 (2003).

28. R.S. Sharafiddinov, Spacetime Subst. **3**, 132 (2002); Bull. Am. Phys. Soc. **59**, T1.00005 (2014); e-print arXiv:physics/0305014.

29. J. Milnor, Am. Math. Month. **90**, 353 (1993).

30. H. Abelson, A. diSessa and L. Rudolph, Am. J. Phys. **43**, 579 (1975).

31. E.J. Aiton, Ann. Sci. **20**, 81 (1964).

32. E.J. Aiton, Ann. Sci. **20**, 111 (1964).