Structure model of tin nucleus ${}^{120}_{50}S_n$

Michael Tzoumpas

Mechanical and Electrical Engineer
National Technical University of Athens
Irinis 2, 15234 Athens, Greece

E-mail: m.tzoumpas@gmail.com

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Abstract. After the nuclei of oxygen ${}^{16}_{8}O$ and calcium ${}^{40}_{20}C_a$, which are the first and the second upper-order ones, the tin nucleus ${}^{120}_{50}S_n$ is the third upper-order nucleus. Its structure is based on the successive conversions of iron ${}^{56}_{26}F_e$ and nickel ${}^{60}_{28}N_i$ into tin nucleus ${}^{120}_{50}S_n$. From this third upper-order nucleus the fourth one is constructed (orion nucleus ${}^{307}_{125}O_r$), as a forecast by the unified theory of dynamic space. The atomic numbers Z of the above four upper-order nuclei are the so-called four "magic numbers", i.e. $Z_1 = 8$, $Z_2 = 8 \cdot 2,5 = 20$, $Z_3 = 20 \cdot 2,5 = 50$ and $Z_4 = 50 \cdot 2,5 = 125$, according to the mirror symmetry (Figs 4 and 5). It is noted that, this forecast of orion nucleus ${}^{307}_{125}O_r$ with an atomic number $Z_4 = 125$ is the corresponding "hypothetical unbihexium Ubh", whose the different atomic number is $Z = 126$. However, the number $Z_4 = 125$ looks symmetrical and not magical at all, due to the $2,5$ factor.

Keywords: Upper-order nuclei; magic numbers; mirror symmetry.

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1. Structure model of atomic nuclei

According to the unified theory[1,2] of dynamic space the atomic nuclei[3,4] have been structured through two fundamental phenomena.[5] The inverse electric field[6] of the proton and the electric entity of the macroscopically neutral neutron.[7]

Verification of the experimental value the spin,[8] the magnetic moment[9] and the mass deficit[10] of the nucleus is the first and necessary condition of its structure. Specifically, the nucleus spin is the sum of its nucleons spin as well as of the magnetic moment and the mass deficit. In addition, it is recalled that at the interaction of proton-neutron the magnetic moment of these nucleons is increased, while at the interaction of same nucleons their magnetic moment is reduced (fluctuation of nucleons magnetic moment[11]). The lower-order nuclei are the deuterium ${}^{2}_{1}H$, the tritium ${}^{3}_{1}H$, the helium ${}^{3}_{2}H_e$ and the helium ${}^{4}_{2}H_e$. This last nucleus, the helium ${}^{4}_{2}H_e$,[5] is the most stable in the Nature, which in the core of the stars is constructed.

The two protons of the helium nucleus $^4_2H_e$ are very near due to the balance between the two strong forces, i.e. the nuclear force and the antigravity one. They have opposite spins and magnetic moments, causing a strong negative field that would instantly cleave them (beta decay β^+). However, the presence of the two neutrons in the inverse electric field reduces its negativity and avoids this decay, creating the helium nucleus $^4_2H_e$.

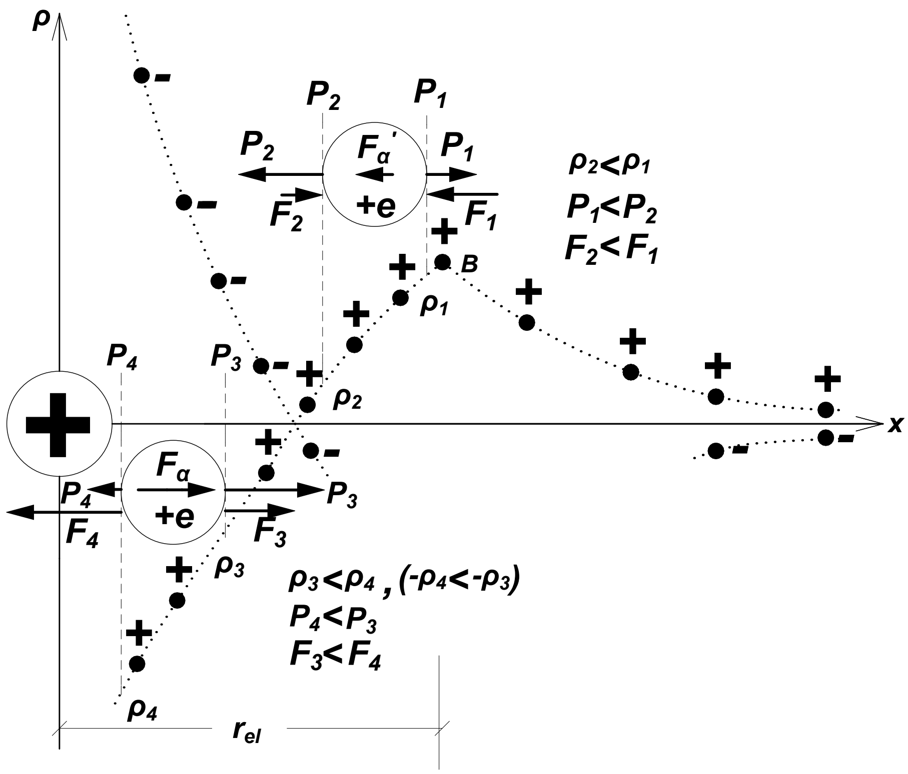

Figure 1. In the upper inverse nuclear field the antigravity force F'_a and the electric resultant[6] $F_1 - F_2$ are attractive, while in the lower field a strong repulsive antigravity force[11] F_a balances the attractive electric resultant[6] $F_4 - F_3$, i.e. the strong nuclear force

Therefore, two protons can not exist in the nucleus without the presence of a neutron, because the increased negativity of field causes a cleaving (beta decay β^+) of one proton. There would be no nuclei without the presence of neutrons that reduce the negativity of the protons field.

As we said, at the nucleus scale the neutron behaves as a positively charged particle[7] and repels the closest proton, which is now moving on a helical orbit emitting gamma radiation and is finally immobilized, due to the balance between the attractive nuclear force and to the strong repulsive antigravity[12] one‡ (Fig. 1). This radiant energy of the

‡ In the lower[6] inverse nuclear field, where the relative electric densities are $-\rho_4 < -\rho_3$ (or $\rho_3 < \rho_4$) and for $\rho = \rho_3$, $\rho = \rho_4$ the respective cohesive pressures[13] P_3 and P_4 are $P_3 = P_0(\rho_0 - \rho_3)/\rho_0$, $P_4 = P_0(\rho_0 - \rho_4)/\rho_0$, so $P_4 < P_3$ and $\Delta P = P_3 - P_4$. So, the buoyancy conditions creates a repulsive antigravity force[12] $F_a = V\Delta P/\Delta x$ in the lower inverse nuclear field (Fig. 1), that balances the attractive electric resultant[6] $F_4 - F_3$ (nuclear force).

proton transmitted by the neutron is measured as mass deficit[10] Δm and is equal to half of the kinetic energy of the neutron.

It is noted that attraction is exerted by the proton's electric field only, causing the neutron to sink deeper into its lower inverse field. After all, there are nuclei, whose neutrons are rotated around columns of strong electric fields (orbital bonding neutrons[14]), in addition of those that around the protons are rotated.

The following is a structure description of tin nucleus ${}^{120}_{50}S_n$, that is based on the successive conversions of iron nucleus ${}^{56}_{26}F_e$ and nickel ${}^{60}_{28}N_i$ into tin nucleus ${}^{120}_{50}S_n$.

1.1. Structure model of iron nucleus ${}^{56}_{26}F_e$

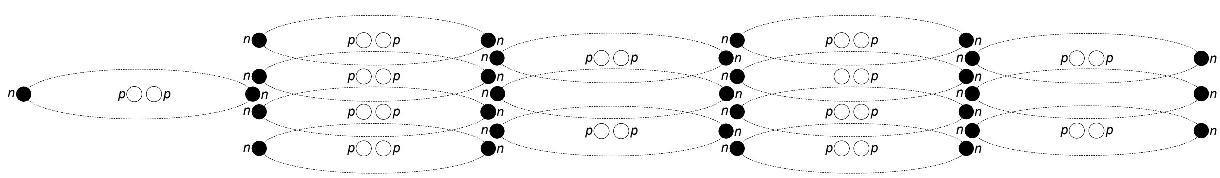

Figure 2. Structure model of iron nucleus ${}^{56}_{26}F_e ={}^{40}_{20} C_a + 3{}^{4}_{2}H_e + 4n$, with addition of two helium nuclei ${}^{4}_{2}H_e$ and one ${}^{4}_{2}H_e$ adjacent to a calcium nucleus ${}^{40}_{20}C_a$, while four orbital bonding neutrons are added

Iron nucleus ${}^{56}_{26}F_e$ (Fig. 2)

$$ {}^{56}_{26}F_e ={}^{40}_{20} C_a + 3{}^{4}_{2}H_e + 4n \tag{1}$$

is derived by addition of two helium nuclei ${}^{4}_{2}H_e$ and one ${}^{4}_{2}H_e$ adjacent to a calcium nucleus ${}^{40}_{20}C_a$, while four orbital bonding neutrons are added, which reduce the strong negativity of the protons field and contribute to the stability of the nucleus.

The experimental spin is

$$ s = 0 + 0 + 0 = 0 \Rightarrow s = 0 \tag{2}$$

and the experimental magnetic dipole moment is

$$ \mu = 0 + 0 + 0 = 0 \Rightarrow \mu = 0. \tag{3}$$

The experimental mass deficit of iron nucleus ${}^{56}_{26}F_e$ is (Eq. 1)

$$ \Delta m = 341,35 + (3 \cdot 28,22 + 7,38) + 4 \cdot 14,57 = 491,68MeV, \tag{4}$$

where

$$ \Delta m' = 7,38MeV \tag{5}$$

is the increased mass deficit of the three helium nuclei ${}^{4}_{2}H_e$, due to the electric field of the calcium's protons. Also, it is reminded that the mass deficit of ${}^{40}_{20}C_a$ is[15] $\Delta m = 341,35$MeV and of ${}^{4}_{2}H_e$ is[5] $\Delta m = 28,22$MeV.

1.2. Structure model of nickel nucleus $^{60}_{28}N_i$

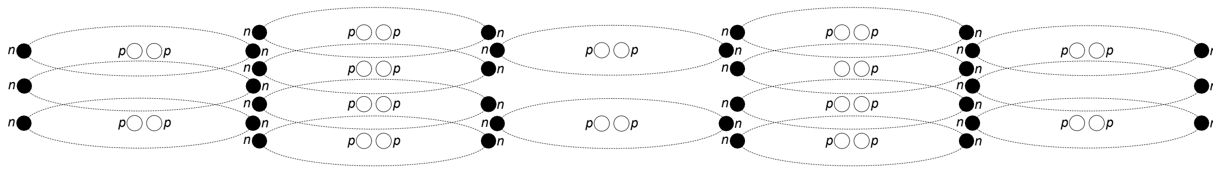

Figure 3. Structure model of nickel nucleus $^{60}_{28}N_i =^{40}_{20} C_a + 4^4_2H_e + 4n$, with addition of two helium nuclei $^4_2H_e$ and two $^4_2H_e$ adjacent to a calcium nucleus $^{40}_{20}C_a$, while four orbital bonding neutrons are added

Nickel nucleus $^{60}_{28}N_i$ (Fig. 3)

$$^{60}_{28}N_i =^{40}_{20} C_a + 4^4_2H_e + 4n \tag{6}$$

is derived by addition of two helium nuclei $^4_2H_e$ and two $^4_2H_e$ adjacent to a calcium nucleus $^{40}_{20}C_a$, while four orbital bonding neutrons are added, which reduce the strong negativity of the protons field and contribute to the stability of the nucleus.

The experimental spin is

$$s = 0 + 0 + 0 = 0 \Rightarrow s = 0 \tag{7}$$

and the experimental magnetic dipole moment is

$$\mu = 0 + 0 + 0 = 0 \Rightarrow \mu = 0. \tag{8}$$

The experimental mass deficit of nickel nucleus $^{60}_{28}N_i$ is (Eq. 6)

$$\Delta m = 341,35 + (4 \cdot 28,22 + 7,38) + 4 \cdot 11,06 = 505,86MeV, \tag{9}$$

where

$$\Delta m' = 7,38MeV \tag{10}$$

is the increased mass deficit of the four $^4_2H_e$, due to the electric field of the calcium's protons. Also, it is reminded that the mass deficit of $^{40}_{20}C_a$ is[15] $\Delta m = 341,35$MeV and of one $^4_2H_e$ is[5] $\Delta m = 28,22$MeV.

1.3. Structure model of tin nucleus $^{120}_{50}S_n$

Tin nucleus $^{120}_{50}S_n$ (Figs 4 and 5)

$$^{120}_{50}S_n =^{40}_{20} C_a + 5^4_2H_e +^{40}_{20} C_a + 20n \tag{11}$$

or

$$^{120}_{50}S_n =^{40}_{20} C_a + \frac{1}{2} \cdot^{40}_{20} C_a +^{40}_{20} C_a + 20n \tag{12}$$

is constructed by repeating of the calcium nucleus $^{40}_{20}C_a$ and a half of it for connection (mirror symmetry/2,5 factor), while twenty orbital bonding neutrons are added, which reduce the strong negativity of the protons field and contribute to the stability of the nucleus.

In Fig. 4 it is repeated the same image on the other three sides of the rectangular parallelepiped, while the lonely helium nucleus ${}^{4}_{2}H_e$ of the above figure is placed in its center. In Fig. 5, the four corner columns of negative potential appear with the four helium nuclei ${}^{4}_{2}H_e$ and the three neutrons each, also the four middle columns of negative potential appear with the two helium nuclei ${}^{4}_{2}H_e$ and the two neutrons each, while the lonely helium nucleus ${}^{4}_{2}H_e$ appears in the center.

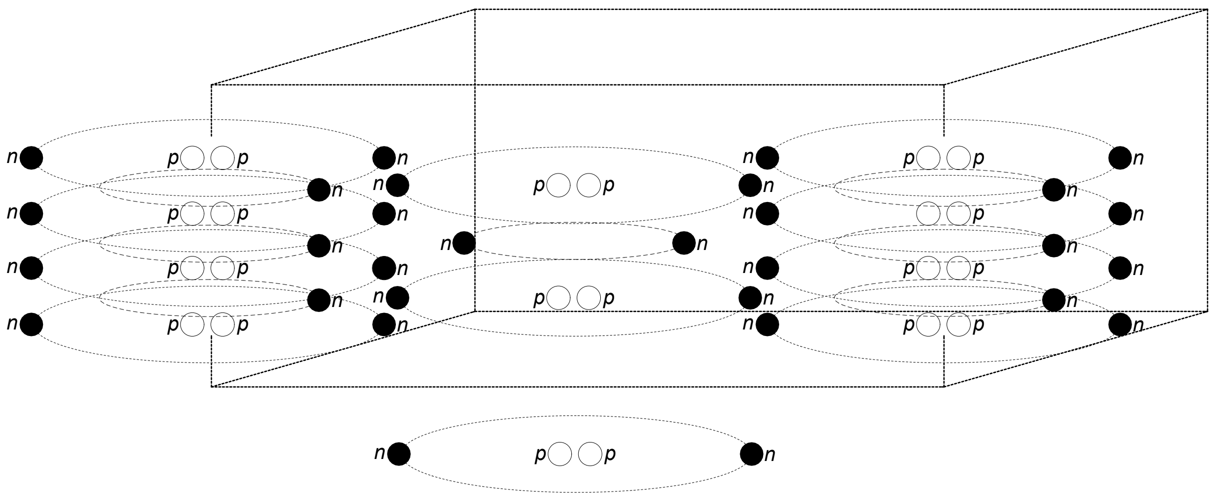

Figure 4. Stereoscopic representation of the tin nucleus ${}^{120}_{50}S_n$, where the same image on the other three sides of the rectangular parallelepiped is repeated, while the lonely helium nucleus ${}^{4}_{2}H_e$ is placed in its center

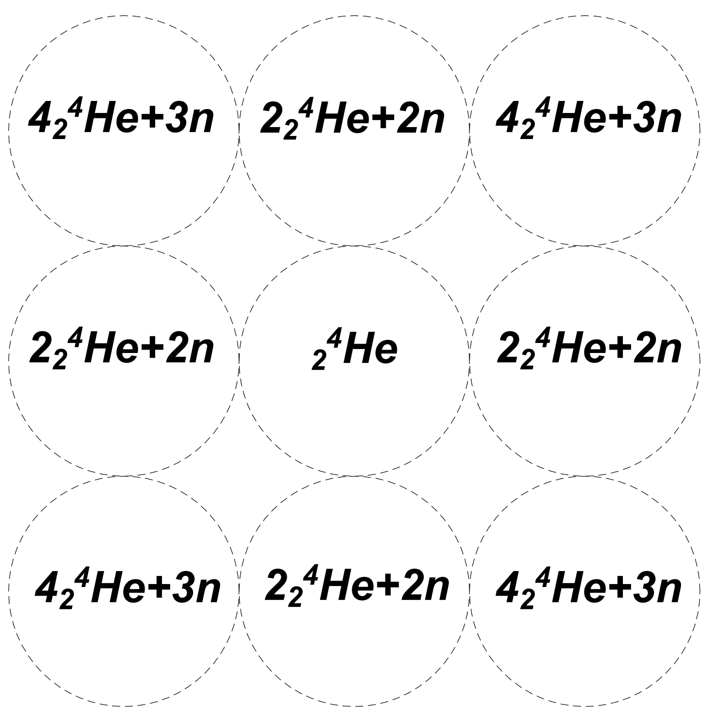

Figure 5. Top view of Fig. 4, where the mirror symmetry of the 2,5 factor for the construction of the tin nucleus ${}^{120}_{50}S_n$ appears

The experimental spin is

$$s = 0 + 0 + 0 = 0 \Rightarrow s = 0 \qquad (13)$$

and the experimental magnetic dipole moment is

$$\mu = 0 + 0 + 0 = 0 \Rightarrow \mu = 0. \qquad (14)$$

The experimental mass deficit of tin nucleus ${}^{120}_{50}S_n$ is (Eq. 12)

$$\Delta m = 341,35 + \frac{1}{2} \cdot 341,35 + 341,35 + 20 \cdot 8,3 = 1019,31MeV. \qquad (15)$$

Also, it is reminded that the mass deficit of ${}^{40}_{20}C_a$ is[15] $\Delta m = 341,35$MeV.

After the nuclei of oxygen ${}^{16}_{8}O$ and calcium ${}^{40}_{20}C_a$, which are the first and the second upper-order ones, the tin nucleus ${}^{120}_{50}S_n$ is the third upper-order nucleus. From this third upper-order nucleus the fourth one is constructed (orion nucleus ${}^{307}_{125}O_r$), as a forecast by the unified theory of dynamic space.[1,2]

The atomic numbers Z of the above four upper-order nuclei are the so-called four "magic numbers", i.e. $Z_1 = 8$, $Z_2 = 8 \cdot 2,5 = 20$, $Z_3 = 20 \cdot 2,5 = 50$ and $Z_4 = 50 \cdot 2,5 = 125$, according to the mirror symmetry. It is noted that, this orion nucleus ${}^{307}_{125}O_r$ with an atomic number $Z_4 = 125$ is the corresponding "hypothetical unbihexium Ubh", whose the different atomic number is $Z = 126$. However, the number $Z_4 = 125$ looks symmetrical and not magical at all, due to the $2,5$ factor.

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