Structure model of uranium nucleus ${}^{235}_{92}U$

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Abstract. The structure of the nuclei begins with the so-called lower-order nuclei, as the deuterium ${}^{2}_{1}H$, tritium ${}^{3}_{1}H$ and helium ${}^{3}_{2}He$, which evolve into helium nucleus ${}^{4}_{2}He$ and then first upper-order oxygen nucleus ${}^{16}_{8}O$ that has four helium nuclei ${}^{4}_{2}He$ in a column of strong negative electric field. Furthermore, the second upper-order calcium nucleus ${}^{40}_{20}Ca$ is based on the fundamental natural phenomenon of mirror symmetry, by repeating the first upper-order oxygen nucleus and its half, i.e. at the 2,5 factor. The same stands with the third upper-order tin nucleus ${}^{120}_{50}Sn$, which emerged from the second upper-order calcium nucleus ${}^{40}_{20}Ca$, according to the mirror symmetry and the same 2,5 factor. It is noted that the tin nucleus ${}^{120}_{50}Sn$ will further form the basis for the structure of all heavy nuclei up to the radioactive uranium nucleus ${}^{235}_{92}U$. That is the simple and elegant structure model, according to which the nuclei consist of fixed helium nuclei ${}^{4}_{2}He$ (plus deuterium, tritium and helium ${}^{3}_{2}He$, all evolving into helium ${}^{4}_{2}He$) and neutrons rotating around of them.

Keywords: Upper-order nuclei; mirror symmetry.

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1. Structure model of third upper-order tin nucleus ${}^{120}_{50}Sn$

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]

The structure of the nuclei begins with the so-called lower-order nuclei, as the deuterium ${}^{2}_{1}H$, tritium ${}^{3}_{1}H$ and helium ${}^{3}_{2}He$, which evolve into helium ${}^{4}_{2}He$[5] and then first upper-order oxygen nucleus ${}^{16}_{8}O$,[8] that has four helium nuclei ${}^{4}_{2}He$ in a column of strong negative electric field.

Furthermore, the second upper-order calcium nucleus ${}^{40}_{20}Ca$[9] is based on the fundamental natural phenomenon of mirror symmetry, by repeating the first upper-order oxygen nucleus and its half, i.e. at the 2,5 factor. The same stands with the third upper-order tin nucleus $^{120}_{50}Sn$[10] (Figs 1 and 2), which emerged from the second upper-order calcium nucleus, according to the mirror symmetry and the same 2,5 factor.

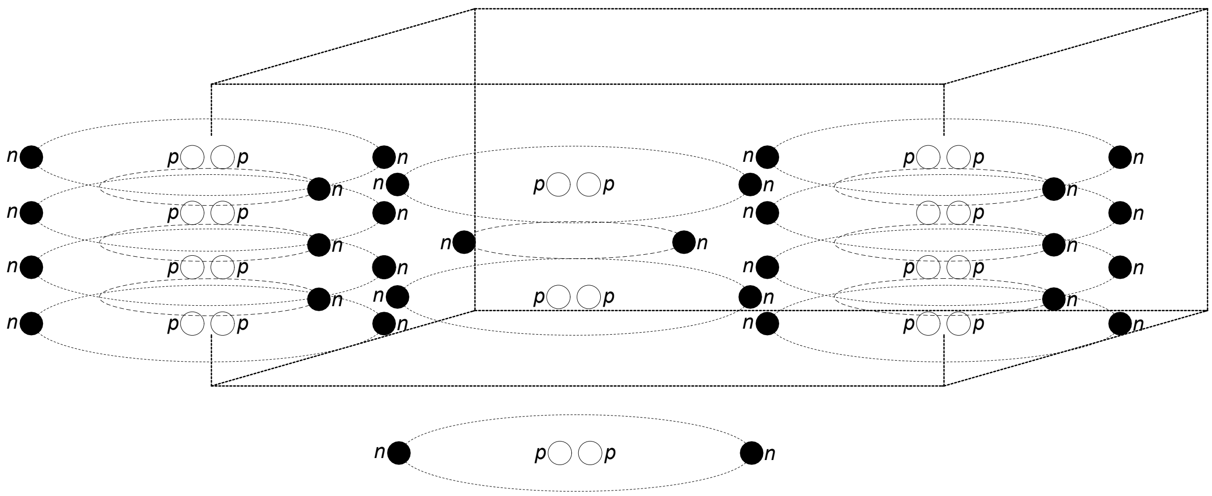

Figure 1. Stereoscopic representation of the tin nucleus $^{120}_{50}Sn$, where the same image on the other three sides of the rectangular parallelepiped is repeated, while the lonely helium nucleus $^{4}_{2}He$ is placed in its center

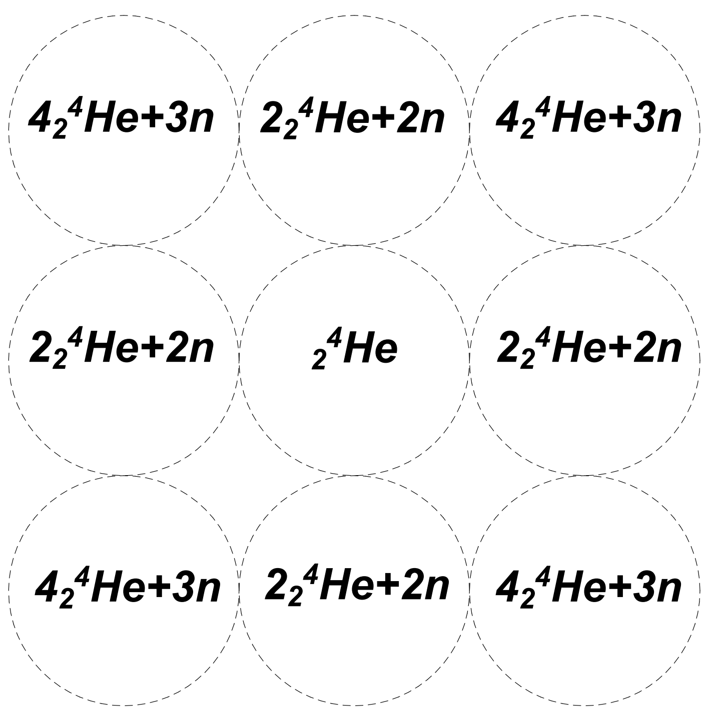

Figure 2. Top view of Fig. 1, where the mirror symmetry of the 2,5 factor for the construction of the tin nucleus $^{120}_{50}Sn$ appears

In Fig. 1 it is repeated the same image on the other three sides of the rectangular parallelepiped, while the lonely helium nucleus $^{4}_{2}He$ of the above figure is placed in its center. In Fig. 2, the four corner columns of negative potential appear with the four helium nuclei ${}^{4}_{2}He$ and the three neutrons each, also the four middle columns of negative potential appear with the two helium nuclei ${}^{4}_{2}He$ and the two neutrons each, while the lonely helium nucleus ${}^{4}_{2}He$ appears in the center.

It is noted that the tin nucleus ${}^{120}_{50}Sn$ will further form the basis for the structure of all heavy nuclei up to the radioactive uranium nucleus ${}^{235}_{92}U$.

That is the simple and elegant structure model, according to which the nuclei consist of fixed helium nuclei ${}^{4}_{2}He$ (plus deuterium, tritium and helium ${}^{3}_{2}He$, all evolving into helium ${}^{4}_{2}He$) and neutrons rotating around of them.

1.1. Structure model of iodine nucleus ${}^{127}_{53}I$

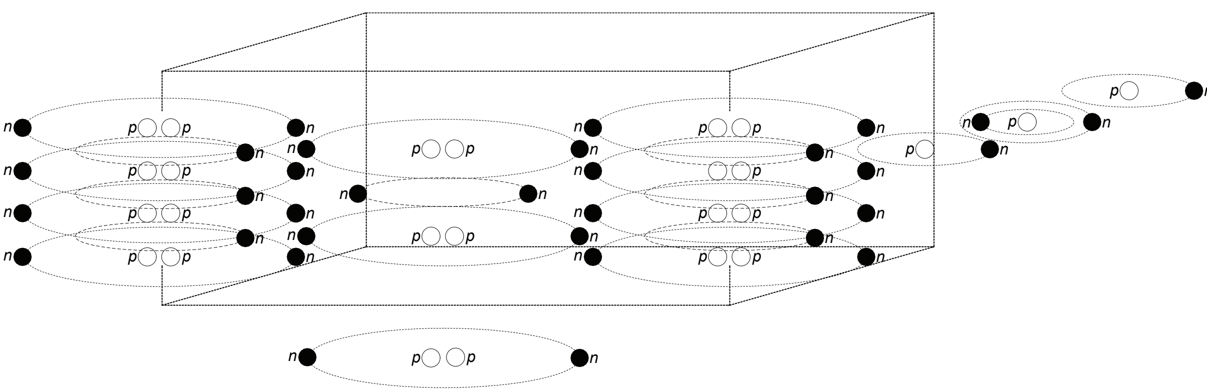

Figure 3. Stereoscopic representation of the iodine nucleus ${}^{127}_{53}I$, where appears the addition of two deuterium nuclei ${}^{2}_{1}H$ and one tritium nucleus ${}^{3}_{1}H$ adjacent onto the side of a tin nucleus ${}^{120}_{50}Sn$ (Figs 1 and 2)

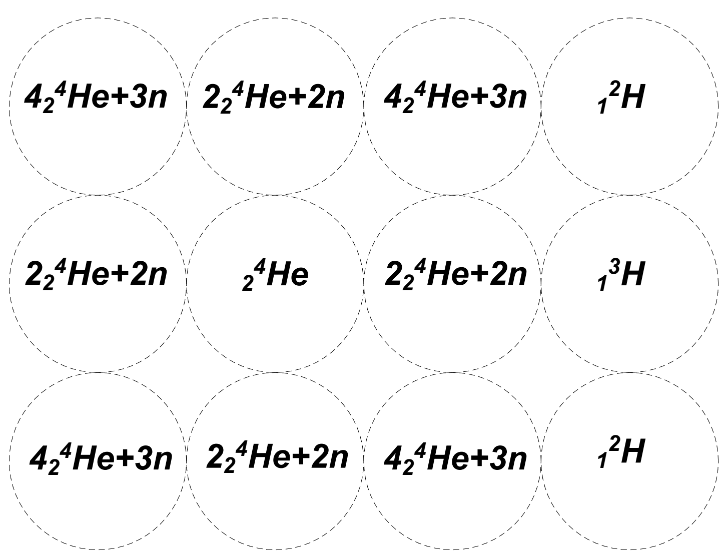

Figure 4. Top view of Fig. 3, where appears the mirror symmetry of the 2,5 factor of tin nucleus ${}^{120}_{50}Sn$, while the iodine nucleus ${}^{127}_{53}I$ is constructed from the addition of two deuterium nuclei ${}^{2}_{1}H$ and one tritium nucleus ${}^{3}_{1}H$

Iodine nucleus $^{127}_{53}I$ (Figs 3 and 4)

$$^{127}_{53}I =^{120}_{50} Sn + 2^2_1H +^3_1 H \tag{1}$$

is constructed from the addition of two deuterium nuclei and one tritium, adjacent onto the side of a tin nucleus $^{120}_{50}Sn$.

The experimental spin is

$$s = 0 + 2 \cdot 1 + \frac{1}{2} = \frac{5}{2} \Rightarrow s = \frac{5}{2} \tag{2}$$

and the experimental magnetic dipole moment is (Eq. 1)

$$\mu = 0+2(0,857-a)+(2,978-1,898+2a) = 2,794\mu_n \Rightarrow \mu = 2,794\mu_n, \tag{3}$$

where the reduced magnetic moment of deuterium and tritium is due to the strong negative electric field. It is reminded that the magnetic moment of tin, deuterium and tritium is $\mu = 0,$[10] $\mu = 0,857\mu_n$[5] and $\mu = 2,978\mu_n$[5] respectively.

The experimental mass deficit of iodine nucleus $^{127}_{53}I$ is (Eq. 1)

$$\Delta m = 1019,31 + 2(2,2 + 10) + (8,48 + 19,07) = 1071,26MeV, \tag{4}$$

where the increased mass deficit of deuterium and tritium is due to the strong negative electric field. Also, it is reminded that the mass deficit of tin, deuterium and tritium is $\Delta m = 1019\text{MeV},$[10] $\Delta m = 2,2\text{MeV}$[5] and $\Delta m = 8,48\text{MeV}$[5] respectively.

1.2. Structure model of lead nucleus $^{208}_{82}Pb$

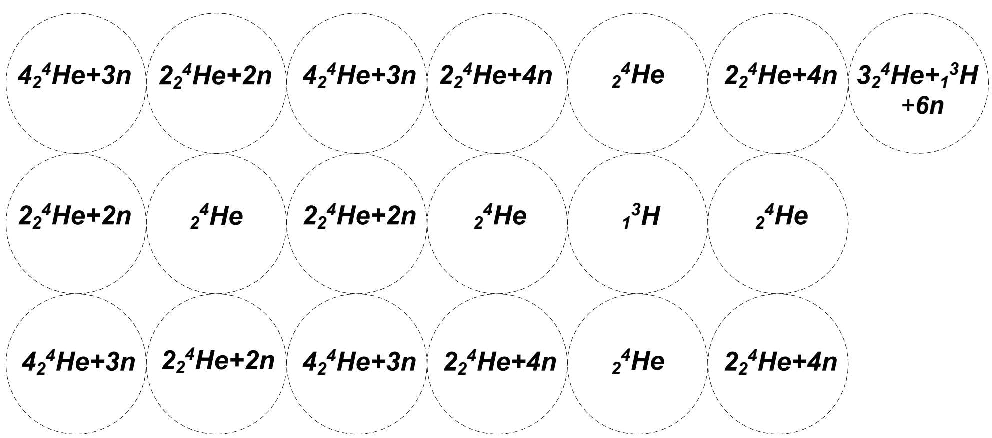

Figure 5. Representation of the lead nucleus $^{208}_{82}Pb$, where appears the addition of three helium nuclei ^4_2He, one tritium nucleus ^3_1H and six bonding neutrons adjacent to the corner potential column of rhenium nucleus $^{187}_{75}Re$

Lead nucleus $^{208}_{82}Pb$

$$^{208}_{82}Pb =^{120}_{50} Sn + \frac{1}{2} \cdot^{120}_{50} Sn + 3^4_2He +^3_1 H + 6n + 6n + n \tag{5}$$

is constructed by one tin nucleus $^{120}_{50}Sn$,[10] a half of it, three helium nuclei ^4_2He, one tritium nucleus ^3_1H and thirteen neutrons.

However, rhenium nucleus ${}^{187}_{75}Re$ (indicatively see Fig. 5)

$$ {}^{187}_{75}Re = {}^{120}_{50}Sn + \frac{1}{2} \cdot {}^{120}_{50}Sn + 6n + n \tag{6} $$

is constructed by one tin nucleus ${}^{120}_{50}Sn$[10] (Fig. 1 and 2), a half of it and six orbital bonding neutrons[11] are added, while one neutron added in deuterium nucleus ${}^{2}_{1}H$ (a half helium nucleus ${}^{4}_{2}He$) that evolves into tritium nucleus ${}^{3}_{1}H$.[5]

So, for lead nucleus ${}^{208}_{82}Pb$ (Fig. 5) Eq. 5, due to Eq. 6, is written

$$ {}^{208}_{82}Pb = {}^{187}_{75}Re + 3\,{}^{4}_{2}He + {}^{3}_{1}H + 6n, \tag{7} $$

namely it is constructed from the addition of three helium nuclei ${}^{4}_{2}He$, one tritium nucleus ${}^{3}_{1}H$ and six orbital bonding neutrons adjacent to the corner potential column of rhenium nucleus ${}^{187}_{75}Re$.

1.3. Structure model of bismuth nucleus ${}^{209}_{83}Bi$

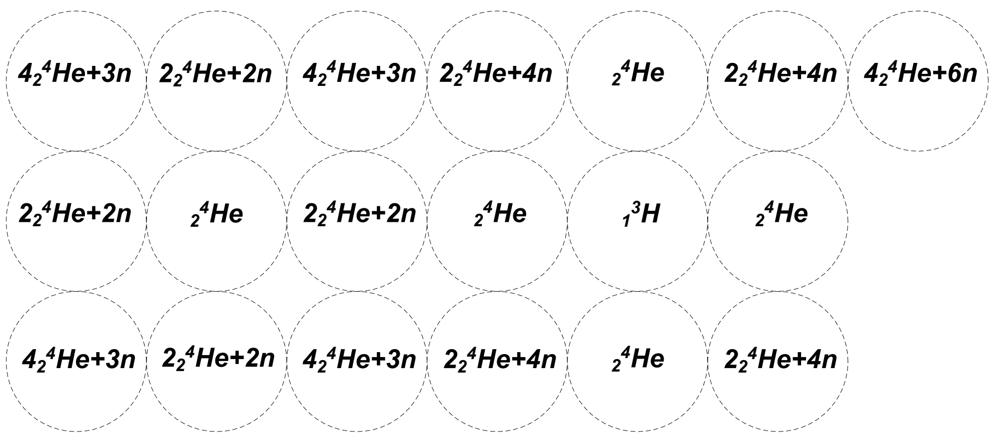

Figure 6. Representation of the bismuth nucleus ${}^{209}_{83}Bi$, where appears the addition of four helium nuclei ${}^{4}_{2}He$ and six bonding neutrons adjacent to the corner potential column of rhenium nucleus ${}^{187}_{75}Re$

Furthermore, bismuth nucleus ${}^{209}_{83}Bi$ (Fig. 6)

$$ {}^{209}_{83}Bi = {}^{187}_{75}Re + 4\,{}^{4}_{2}He + 6n \tag{8} $$

is constructed from the addition of four helium nuclei ${}^{4}_{2}He$ and six orbital bonding neutrons[11] adjacent to the corner potential column of rhenium nucleus ${}^{187}_{75}Re$.

1.4. Structure model of uranium nucleus ${}^{235}_{92}U$

Additionally, uranium nucleus ${}^{235}_{92}U$ (Fig. 7)

$$ {}^{235}_{92}U = {}^{209}_{83}Bi + ({}^{4}_{2}He + {}^{3}_{1}H + n) + (2\,{}^{4}_{2}He + 2\,{}^{3}_{1}H + 4n) \tag{9} $$

is constructed from the addition of one helium nucleus ${}^{4}_{2}He$, one tritium ${}^{3}_{1}H$ and one orbital bonding neutron[11] adjacent to the middle potential column of bismuth nucleus

${}^{209}_{83}Bi$, while two helium nuclei ${}^{4}_{2}He$, two tritium nuclei ${}^{3}_{1}H$ and four orbital bonding neutrons are added at the other corner potential column of bismuth nucleus.

Uranium nucleus ${}^{235}_{92}U$ is structured from helium nuclei ${}^{4}_{2}He$ (plus the tritium nuclei ${}^{3}_{1}H$), while the weak link of uranium ${}^{235}_{92}U$ is the unstable nucleus of the tritium ${}^{3}_{1}H$, which is located at its center, where the strong negative electric field of the protons prevails. This critical point becomes an attraction pole of neutrons, i.e. of a thermal neutron and rarely of a fast one, which it is cleaved (beta decay β^-), incorporating the produced proton into the tritium nucleus ${}^{3}_{1}H$, turning it into helium nucleus ${}^{4}_{2}He$. So, this mechanism acts as a catalyst for the nuclear fission of uranium ${}^{235}_{92}U$ with the most common products being barium nucleus ${}^{141}_{56}Ba$ and the krypton nucleus ${}^{92}_{36}Kr$ plus three neutrons as in nuclear reaction

$$n +^{235}_{92} U \longrightarrow^{141}_{56} Ba +^{92}_{36} Kr + 3n. \tag{10}$$

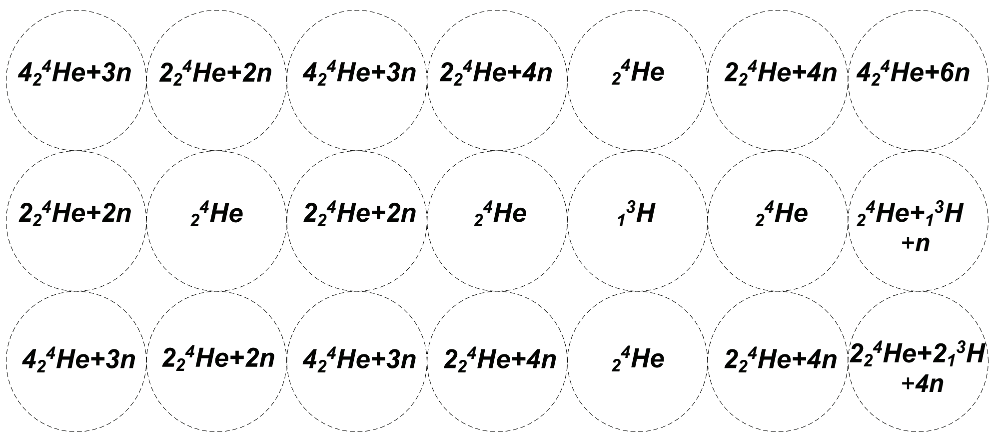

Figure 7. Representation of the uranium nucleus ${}^{235}_{92}U$, where appears the addition of one helium nucleus ${}^{4}_{2}He$, one tritium and one orbital bonding neutron at the middle potential column of bismuth nucleus ${}^{209}_{83}Bi$, while the addition of two helium nuclei ${}^{4}_{2}He$, two tritium nuclei and four orbital bonding neutrons appears at the other corner potential column of bismuth ${}^{209}_{83}Bi$

2. References

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