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14 nuclear stability, particle beam forming Principle and parameter calculation

14.1 nuclear stability analyses

14.1.1 Particles spiral ring of $\pi^{\pm}$ mesons in stability analysis

From 7 to 13 chapters nucleus internal structure, the formation of the nuclear force, principle and parameter simulation of already know: nuclear power charge number $Z_i \geq 6$ all conditions within the nucleus of the high and low positive and negative $\pi^{\pm}$violation. Both high, low-energy particle spiral ring, which take different number $\pi^{\pm}$muon to the charge. So, under what conditions, the same particles spiral ring, the same fluctuation, spin elliptical orbit in the movement of the positive and negative $\pi^{\pm}$ muon to stability, not as positive, antimatter merge, annihilation, huge burst of energy?

To formed from chapter 2, 3 elementary particle energy principles and the internal and external interactions analysis: high, low positive and negative$\pi^{\pm}$ mesons are made by 2 to the electric dipole and a charged particles. By (3.5-1), (3.5-2) - the results compared to: each charged particles around v_a fluctuations rail $K_r v_a$ rotating speed, speed, spin velocity v_θ and speed of the vz must be higher than the speed of light $v_z \geq$ c, charged particles can be stable. By (2.1), (2.2), in order to speed $v_z \geq$ c motion of charged particles, high voltage, the formation of magnetic field distribution in vertical speed is completely v_z=c movement orbit plane, along the track the tangent direction of the electric and magnetic field strength are tending to o! The spin direction, the same particles spiral ring of$\pi^{\pm}$ muon fully equal to the speed of the spin, interval, often in different wave track loop, and the same particles spiral ring and other particles spiral ring of$\pi^{\pm}$ muon contain attract effect of the electric field force, between each other internal will automatically adjust to balance. So, to:

$$v_z = \sqrt{v_\alpha^2 + v_\theta^2 + (K_r v_\alpha)^2} \geq c \qquad (14.1)$$

By equations (1.2), (1.5), (2.1), (2.12), (2.13), make fluctuation velocity for $\dot{\alpha}$, too:

$v_a=\beta c$, $v_\theta = \beta c / \sqrt{N_\alpha}$, $K_r v_\alpha = K_r R_\alpha \dot{\alpha} = K_r R_\alpha \beta c / 2\pi R_\alpha = K_r \beta c / 2\pi$, generation into (14.1), to:

$$v_z = \beta c \sqrt{1 + \frac{1}{N_\alpha} + \left(\frac{K_r}{2\pi}\right)^2} \geq c \qquad (14.2)$$

When $2.5 \leq N_a \leq 500$, by the table 2.1, the $\pi^\pm$ mesons, because $1.13995\times10^{-5} \leq K_r \leq 16.8629\times10^{-5}$, so:

$$v_z \approx \beta c \sqrt{1 + \frac{1}{N_\alpha}} \geq c \qquad (14.3)$$

By (4.9), (14.3), the numerical simulation to:

$N_a \geq 388$ $\quad v_z \leq 0.9999986639c$

$N_a \leq 387$ $\quad v_z \geq 1.000001989c$

By figure 7.1 and figure 7.2 nucleus internal structure, hypothesis 5 layers of high and low of high-energy particles spiral ring positive and negative $\pi^\pm$ mesons in low-energy particles spiral rings continue to peripheral transition, and in the process of transition, if the layer of particles spiral ring inside protons and neutrons are even a, and magnetic moment always is 0, then to: $N_{ad5}=88$， $N_{ag5}=388\sim391$.

Conditions within the nucleus stability parameter calculation results comparison table 14.1

N_{ad5}	N_{ag5}	$R_{\theta d5(\pi)}\times10^{-14}$m	$R_{\theta g5(\pi)}\times10^{-14}$m
	388	1.109875689	1.106463483
88	390	1.109871285	1.109169534
	391	1.109869099	1.110519962

Refer to section 9.1 2 ~ 6 calculation program, by (8.1), we calculate is higher, low-energy particle spiral ring and negative $\pi^\pm$ violation of $R_{\theta g5(\pi)}$, $R_{\theta d5(\pi)}$ of space tolerance relation, the results shown in table 14.1.

By (14.3), table 14.1 the results to: $388 \leq N_{ag5} \leq 390$, is the fifth ring particles spiral layer within the nucleus of high-energy $\pi_g^\pm$ to positive and negative mesons in unstable interval. So, particles within the nucleus spiral ring layer is composed of five layers can be at most. If bottom side by side, low-energy particles spiral ring for up to 6 prevailed, by (9.12), atomic nuclei saturated when most can only accommodate 290 nuclear, and 6 layer is not stable, If the 4 layer, the saturated as 234 nuclear, and natural radiation is starting nuclear $^{232}_{90}Th$, $^{235}_{92}U$, $^{238}_{92}U$, (behind will prove, separate a^{++} high, low-energy particles spiral ring in heavy nuclei the spin axis on the proper position can long-term stable existence).

Scientists predicted that nuclear power charge number for 114 a stable island, near their corresponding to the total number of nuclear also is around 290. According to the analysis of this section: nucleus can consist of 6 particles spiral ring, saturated when can accommodate 290 nuclear; Beyond will lead to high and low to $\pi_g^{\pm}$ to positive and negative violation of unstable; So, the prophecy is bound to fail.

14.1.2 Nucleus kernel force stability analysis

By (7.2) - the results and chapter 11 ~ 13 nucleus internal structure, the nuclear force balance verification comprehensive comparison of the calculated results can be seen that: each individual charged particles spiral ring, the spin elliptical orbit radius in the direction of integrated electrical, magnetic force, the centrifugal force of interaction between don't need to consider. Is located in the nucleus spin of charged particles in the plane of the equator spiral ring, as long as nuclear charge distribution on the equator plane symmetric on both sides, also need not consider nuclear power, the magnetic field strength. Most B type structure of the nucleus, as a result of the adjacent low-energy particles spiral ring layer on the whole of the medial low-energy particles spiral ring, have set, to overcome the stability of the nuclear power field force. Except for the bottom layer 1, other layers inside the particles spiral ring spin elliptical orbit non-oil imports of ampere force general field force is greater than nuclear power. At the bottom, especially the bottom inside the particles spiral ring spin elliptical orbit non-oil imports most of ampere force is less than the nuclear field force, rely on particles spiral ring side by side the whole current of ampere force $\triangle F_{\theta bj}$ added to maintain nuclear force balance. By (10.17) and chapter 11 ~ 13 nucleus internal structure, the nuclear force balance comparative test results: as long as the bottom side by side particles spiral loop net with high and low π^+ violation to the lateral migration, nuclear power field force $F_{e\theta j}$ will increase greatly, and the whole $\triangle F_{\theta bj}$ accidents of ampere force is greatly reduced, and even as a negative value, the original is squeezed into a upcountry outward expansion, the bottom of the nucleus particles spiral ring nuclear force can't balance. So, along the spin of the elliptical orbit axial positively charged electronic β^+, a^{++} particle, p^+ proton injection decay is unable to avoid. See section 14.3 and 14.4 calculation example.

14.2 particle beam forming principle within the nucleus

14.2.1 Particle radiation type and develop trend within the nucleus

Laboratory has detected particle emission in the process of the decay of nuclear fission rays are: a^{++} particle, p^+ protons, n neutrons, positive and negative $\beta^{\pm}$. Otherwise epsilon ε orbit electronic capture, is equivalent to the antiparticle positron β^+ emission, this chapter boils down to study together.

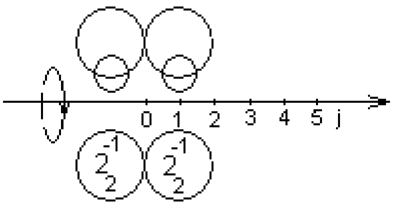
Common law is the formation of this particle ray: with the same number of nuclear power by isotope, neutron numbers less or, at least equivalent to nuclear net with high-energy π_g^+ muon comparatively much, mainly produce a^{++} particle, p$^+$positron protons, β^+ rays and ε epsilon track electronic capture. Along with the increased number of neutrons, mainly produce β^- diffusion and n neutron rays. During the whole process of nuclear fission decay, most with γ rays, the conservation of energy is always, always in the direction of energy gradually reduce the parent nucleus occur spontaneously. Section 14.1.1 same particles spiral rings $\pi^\pm$ mesons in stability analysis has been mentioned, $\pi^\pm$ muon must maintain proper ratio, internal, electric attraction between each other mutual contain to maintain balance. Therefore, only protons, neutrons to maintain the proper proportion, the relative excess of high and low $\pi^\pm$ muon rejection, nucleus can maintain stable finally.

14.2.2 a^{++} Particle internal structure and parameter calculation

The a^{++} particles is ^4_2He nucleus, the atomic energy measured 4.00260326u, two electronic total ionization energy of 79.003 ev③. By (11.3), too:

$$\sum {}^4_2HeW_0 = 6.644661599\times10^{-27}\text{Kg}$$

By figure 7.5: a^{++} particles within the 6 high-energy $\pi_g^\pm$ muons (including the net with 4 π_g^+ violation), 8 low $\pi_d^\pm$ muons (including the net with 2 π_d^-). Refer to section 11.2 calculation procedures, if we will a^{++} particles designed to type B nucleus, as shown in figure 14.1, the data from table 9.1 and table 9.1:



$$W_e = 8.941660379\times10^{-30}\,Kg$$
$$W_b = 1.53063327\times10^{-30}\,Kg$$
$$\sum {}^4_2HeW_b = 6.619394948\times10^{-27}\,Kg$$

图 14.1 ^4_2He 原子核内核子、净剩

$\pi^\pm$

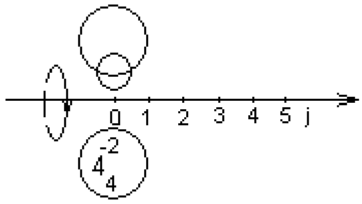
介子分配示意图

$\underset{4}{Va}$ $\overset{4}{\underset{-2}{Vb}}$

If a^{++} particle design into type A nucleus, as shown in the figure 7.1, only A pair of particles spiral ring, see figure 14.2. By (7.2), the nucleus do not exist the spin axis electric and magnetic field strength. From table 9.1 and table 9.1 data, obtained a^{++} particle energy figure 14.2 on the right.

$^4_2$He nucleus kernel force balance verification results table (figure 14.1 units: Newton) of 14.2

N \ j / Nai	0	1	2	3	4	5	核电、磁场力累计
Feθ		b 88.05890278					4.846944828
$\frac{34}{13}$ Fbθ		-14.26555798					
ΔFθb		-68.94639997					



$$\underset{4}{Va} \quad \overset{4}{\underset{-2}{Vb}}$$

$$W_e = 1.744014049 \times 10^{-29} Kg$$

$$W_b = 1.747945042 \times 10^{-30} Kg$$

$$\sum {}^4_2HeW_a = 6.62811074 \times 10^{-27} Kg$$

图 14.2 ^4_2He 原子核内核子、净剩

$\pi^{\pm}$

介子分配示意图

Compare the above two kinds of type A and B a^{++} particle nucleus, are obviously is stable, but has reached the maximum total energy, there is no room for further increase. Because nuclear power charge number $2 \le Z_i < 6$ of the nucleus may be by A pair of high and low among particles spiral ring and edge "sticky" not "decentralized" composed of protons, neutrons, and axial nuclear power field force by the overall current ampere force to maintain balance, so, we can make a^{++} particles in type A nuclear, quantum fluctuations of N_{a1}=34/13 is changeless, and to: $\overline{m}_{d\alpha} = \overline{m}_{d1} \sum {}^4_2HeW_0 \Big/ \sum {}^4_2HeW_\alpha$,In the analysis of the follow-up, a^{++} particles directly take the energy of the experimental value:

$$\sum {}^4_2HeW_0 = 6.644661599 \times 10^{-27} \text{Kg}$$

14.2.3 a^{++} particles and P^{+}protons in nuclei of emission mechanism

Nucleus, a^{++} particles are made by high and low in $\pi^{\pm}$violation. When the bottom of the high and low positive and negative $\pi^{\pm}$ violation by the nuclear spin axial injection out in figure 14.3 relative position, as long as we avoid relatively small interactions of the magnetic field, the electric field force each other to make them in a stable equilibrium state. A nucleus with N_e nuclear power, to a^{++} particles, high-energy particles spiral ring net with 4 π_g^+ mesons, low net with 2 π_d^- violations. The Coulomb's law:

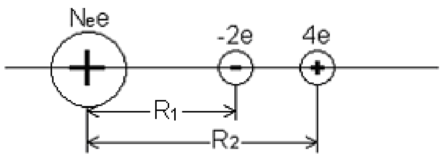


图14.3 原子核与外边带电粒子电场力平衡示意图

Figure 14.3 nuclear and outside charged particle electric field force Equilibrium diagram

$$\begin{cases} \dfrac{2N_e e^2}{4\pi\varepsilon_0 R_1^2\sqrt{1-\dfrac{\beta^2}{N_\alpha}}} = \dfrac{8e^2}{4\pi\varepsilon_0 (R_2-R_1)^2\sqrt{1-\dfrac{\beta^2}{N_\alpha}}} & (14.4-1) \\ \dfrac{4N_e e^2}{4\pi\varepsilon_0 R_2^2\sqrt{1-\dfrac{\beta^2}{N_\alpha}}} = \dfrac{8e^2}{4\pi\varepsilon_0 (R_2-R_1)^2\sqrt{1-\dfrac{\beta^2}{N_\alpha}}} & (14.4-2) \end{cases}$$

Solution (14.4) equations to: $R_2/R_1 = \sqrt{2}$. That is to say, as long as the component a^{++} a pair of high and low particles spiral ring outside the nuclear spin axis and nucleus maintain the relative distance of $R_2/R_1 = \sqrt{2}$, can smoothly from the nucleus, or with a nucleus in the spin axis to balance a long position in a stable state. When high, low-energy particle spiral ring close to combine into a^{++} particles, this equilibrium is destroyed, because nuclear power field force rejection, will lead to a^{++} particle emission.

Similarly, by figure 7.4, we have in the design of the "assembly" nuclear protons p$^+$ split into two energy π_g^+ mesons, a low-energy π_d^- violation, a pair of electric dipole in neutrino or remaining photons released form. According to equations (14.4) of the solution, as long as two high-energy π_g^+ violation, a low-energy π_d^- both of a pair of high and low particles spiral ring, the nuclear spin axis and maintain the relative distance of $R_2/R_1 = \sqrt{2}$, it also can keep balance with the nucleus, or smoothly from the nucleus. High when the nucleus, low-energy particles spiral ring close to, as long as high-energy particles spiral ring in the 2 π_g^+ muon neutrino adsorption field a neutrino, at the same time release a are charged particles, and low-energy particle spiral ring of π_d^- muon exchange a load charged particles, from the figure 6.3, section 6.1 shows that the proton p$^+$ is formed. In the nuclear field force under to actioned of proton p$^+$ rays. Because proton launch mainly in proton number is greater than the number of neutrons unstable light nuclei, despite the launch principle similar to the above a^{++} particles, but the launch process should not only absorbs neutrinos, and exchange, load charged particles, the transformation process is more complicated, so that the appear of proton emission energy, total energy conservation alone simulation unable to reveal the detailed process, behind no longer research.

In addition, the total number of more than 234 nuclear heavy nuclei, the fifth layer of particles spiral rings, high low $\pi_g^{\pm}$ to positive and negative source of instability caused by fluctuation of quantum number N_{ag5}, N_{ad5} change also can produce a^{++} particle ray, see section 14.3 calculation example.

14.2.4 $\beta^{\pm}$ electron beam forming principle

Nucleus each launch a negativeβ^- electronics, total number of nuclear remain unchanged, the parent nucleus nuclear charge will increase the number 1, equivalent to a neutron should be transformed into protons within the parent nucleus. By figure 7.4 that there will be a pair of low-energy $\pi_d^{\pm}$ violation of the π_d^- muon split into β^- electronics and a neutrino or photons, and most of the energy transfer will originally inspired another π_d^+ to low-energy mesons, make its become high-energy $\pi_g^{\pm}$mesons, enter the high-energy muon orbit, β^- electronic depend on residual energy to overcome their own nuclear power field force constraint the launch.

Similarly, nucleus each launch a β^+ positron, total number of nuclear also remain unchanged, the parent nucleus nuclear power by several reduced by 1, equivalent to a proton in the parent nucleus into neutrons. Consist of figure 7.4, $\pi^{\pm}$muon principle, electric dipole number n increased from 2.5 to 2.5, and then, one of the high-energy π_g^+ source must be continuous adsorption four neutrinos, eventually split, into a pair of low-energy $\pi_d^{\pm}$positron emission source and a β^+.

ε epsilon orbit electronic capture and launch a positron effect, the difference is only 1 high-energy π_g^+ violation as long as adsorption neutrino field in a neutrino, and the adsorption of electronic β^- together into a pair of low-energy $\pi_d^{\pm}$muon to enter the low-energy particles spiral ring rail is ok.

14.3 conditions within the nucleus a^{++}
Particle ray energy calculation example

14.3.1 Nuclear number $A_i \geq 234$ Heavy nucleus a^{++} particle ray energy Calculation example

Nuclear total $A_i \geq 234$ and $A_i < 234$ within the nucleus of the a^{++} different particle beam forming principle. Under the calculation example, respectively, in the case of $^{236}_{92}U \rightarrow ^{232}_{90}Th + \alpha^{++}$:

$^{236}_{92}U$ Atomic total energy experimental value is 236.045582 u, K_{a2} layer electronic ionization energy for 94648 ev, generation into (11.3), to:

$$\sum {}^{236}_{92}UW_0 = 3.918948943 \times 10^{-25} \text{Kg}$$

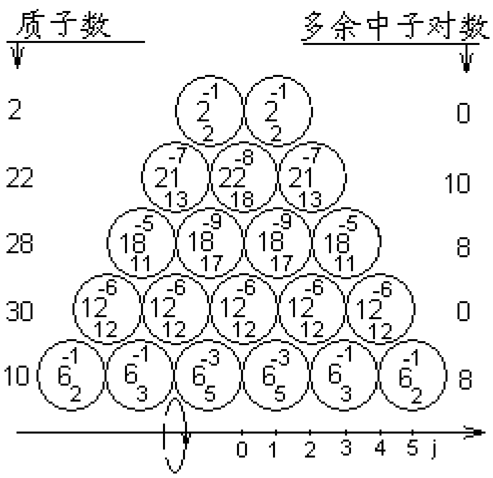


图 14.4 $^{236}_{92}U$ 原子核内核子、净剩

Va_{10}	Vb^{10}_{-6}	Vc^{4}_{6}	Vd^{10}_{-2}	Ve^{8}_{12}	Vf^{20}_{-6}
Vg^{14}_{4}	Vh^{18}_{24}	Vi^{42}_{-2}	Vj^{40}_{-12}	Vk^{28}_{24}	Vl^{52}_{34}
Vm^{86}_{-12}	Vn^{74}_{-18}	Vo^{56}_{22}	Vp^{78}_{-10}	Vq^{68}_{18}	Vr^{86}_{26}
Vs^{112}_{-8}	Vt^{104}_{-14}	Vu^{90}_{4}	Vv^{94}_{2}		

$$W_e = 1.857324426 \times 10^{-27} Kg$$

$$W_b = 1.43454811 \times 10^{-29} Kg$$

$$\sum {}^{236}_{92}UW_1 = 3.918949689 \times 10^{-25} Kg$$

$\pi^{\pm}$

介子分配示意图

$^{236}_{92}U$ Nucleus kernel force balance to verify the results table (figure 14.4, the unit: Newton) table 14.3

j / N_a	1	2	3	4	5		nuclearElectric and magnetic field force ccumulated
88 $F_{e\theta}$ $F_{b\theta}$	v. 29.25187949 -12.0969558					↑	35.83711032
58 $F_{e\theta}$ $F_{b\theta}$		t. 708.9523968 -831.5560456				|	18.68218664
34 $F_{e\theta}$ $F_{b\theta}$	n. 879.4710447 -1547.407343	p. 1134.620304 -859.6707462				|	141.2858354
16 $F_{e\theta}$ $F_{b\theta}$		j. 1177.523760 -943.7382342	m. 332.5403448 -943.7382342			|	-133.6637224
$F_{e\theta}$ 34/13$F_{b\theta}$ $\Delta F_{\theta b}$	b. 474.7645661 -128.3900195 -107.2499554	d. 360.3313781 -42.79667316 -153.2142221	i. -30.52020855 -14.26555772 -114.9106665			|	243.7486412

In 11.5 the $^{232}_{90}Th$ nucleus internal structure, the calculation results as the reference standard. Make redundant four nuclear "decentralized" of high and low $\pi^{\pm}$muon all into 5 levels, low-energy particles spiral ring; see figure 14.4, the total energy figure on the left, the nuclear force balance test results shown in table 14.3.

Make $a^{++}\gamma$ rays in the kinetic energy of the particles and total energy for $W_{\gamma a}$, by the law of conservation of energy:

$$W_{r\alpha} = \sum {}^{236}_{92}UW_1 - \sum {}^{232}_{90}ThW_2 - \sum {}^{4}_{2}HeW_0 \qquad (14.5)$$

Will the correlation value generation into (14.5), to:

$W_{\gamma a1}$=8.847259384×10^{-30}Kg=4.962946Mev

Laboratory determination a^{++} particle kinetic energy has three groups, respectively, 4.494 (73.7%), 4.445 (26%), 4.331 (0.26%) of the Mev (strength). Otherwise γrays in the 2 groups, energy is: 0.1716, 0.2232 Mev. Obviously, a^{++} particle kinetic energy of the weighted average of 4.4790386 Mev, and γ rays total energy $W_{\gamma a0}$=4.8738386Mev. And the model calculation value $W_{\gamma a1}$=4.962946Mev error only 0.08911 Mev. We have reason to speculate that this is the nucleus of magnetic energy simplified simulation of small error, the experimental error or by with nuclear power, and the inner electronic energy caused by the error.

14.3.2 Nuclear number A_i<234 nucleus a^{++} particle ray energy calculation example

In the case of $^{174}_{72}Hf \rightarrow ^{170}_{70}Yb + \alpha^{++}$:

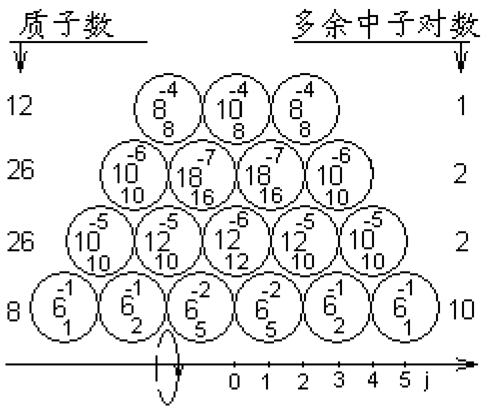
$^{174}_{72}Hf$ Atomic experimental determination of the total energy is 173.940140u, K_{a2} layer electronic ionization energy for 54579 ev, generation of (11.3) in type, to:

$\sum {}^{174}_{72}HfW_0$ =2.887760126×10^{-25}Kg

We are shown in 12.3 $^{170}_{70}Yb$ nucleus of the internal structure, calculation of energy parameters for reference standards. Make four nuclear "decentralized" all of the high and low $\pi^{\pm}$mesons are into 4 layer, low-energy particle spiral ring rail, see figure 14.5, nucleus kernel force balance verification calculation shown in table 14.4.

By the solution of equations (14.4), we can see that: as long as the fourth layer of high and low $\pi^{\pm}$muon particles spiral ring local concentration, it is not stable state; Can the $R_2/R_1=\sqrt{2}$ the relative distance of smoothly along the spin axis from the nucleus. By (7.2), particles spiral ring itself with shrinkage properties. When high, low-energy particle spiral ring once along the edge of the spin axis to slip out of the nucleus, internal support, he will rapidly shrinking to N_{a1} = 34/13 of the limit state, into a^{++} particle type spiral rings, transfer to a certain position after composition a^{++} particles. Throughout the decay in the process of transformation, by (14.5), a^{++} the kinetic energy of the particles W_{a1} for:

W_{a1}=4.571712894×10^{-30}Kg=2.564542Mev



$\underset{10}{Va}$ $\overset{10}{\underset{-4}{Vb}}$ $\overset{6}{\underset{4}{Vc}}$ $\overset{10}{\underset{-2}{Vd}}$ $\overset{8}{\underset{12}{Ve}}$ $\overset{20}{\underset{-6}{Vf}}$

$\overset{14}{\underset{2}{Vg}}$ $\overset{16}{\underset{20}{Vh}}$ $\overset{36}{\underset{-2}{Vi}}$ $\overset{34}{\underset{-10}{Vj}}$ $\overset{24}{\underset{20}{Vk}}$ $\overset{44}{\underset{32}{Vl}}$

$\overset{76}{\underset{-10}{Vm}}$ $\overset{66}{\underset{-14}{Vn}}$ $\overset{52}{\underset{20}{Vo}}$ $\overset{72}{\underset{-12}{Vp}}$ $\overset{60}{\underset{8}{Vq}}$ $\overset{68}{\underset{16}{Vr}}$

$\overset{84}{\underset{-4}{Vs}}$ $\overset{80}{\underset{-8}{Vt}}$

图 14.5 ${}^{174}_{72}Hf$ 原子核内核子、净剩 π^{+}介子分配示意图

$$W_e = 1.230703829\times 10^{-27}\,Kg$$
$$W_b = 9.375240045\times 10^{-30}\,Kg$$
$$\sum {}^{174}_{72}HfW_1 = 2.887756186\times 10^{-25}\,Kg$$

The experiment measured a^{++} the kinetic energy of the particles of 2.50 Mev, results are very well.

If we fine tune ${}^{174}_{74}Hf$ nucleus shown in figure 14.5 4 layer particles spiral ring of $\pi^{\pm}$source distribution condition, can be seen from table 14.4, ${}^{174}_{74}Hf$ nucleus is still stable, a nucleus electric energy coefficient is:

$\overset{60}{\underset{10}{Vq}}$ $\overset{70}{\underset{14}{Vr}}$ $\overset{84}{\underset{-6}{Vs}}$ $\overset{78}{\underset{-6}{Vt}}$ $\quad \sum {}^{174}_{72}HfW_2 = 2.887756894\times 10^{-25}\,Kg$

${}^{174}_{74}Hf$ Nucleus kernel force balance test results list 14.4 (figure 14.5)

j / N_a	1	2	3	4	5		nuclearElectric and magnetic field force ccumulated
58 $F_{e\theta}$ $F_{b\theta}$		t. 348.9357215 -237.5874416				↑	-201.7282867
34 $F_{e\theta}$ $F_{b\theta}$	n. 784.7660255 -936.0859236	p. 760.2467544 -802.3593631				|	-313.0765666
16 $F_{e\theta}$ $F_{b\theta}$		j. 861.2937174 -786.4485285	m. 165.8418776 -655.3737738			|	-270.9639579
$F_{e\theta}$ 34/13$F_{b\theta}$ $\Delta F_{\theta b}$	b. 642.7725138 -57.06223088 -306.4284441	d. 237.204948 -28.53111544 -160.8749332	i. -146.1102978 -14.26555772 -22.98213331			|	143.7227494

Obviously, this is a nuclide with nuclear power. Readers may ask: table 14.4 shows that ${}^{174}_{74}Hf$ nucleus kernel forces are balanced stable, why will decay? Section 14.1.1 of this chapter is that only the protons and neutrons to maintain the proper proportion, remove the excess of high and low $\pi^{\pm}$ muon rejection, nucleus to ultimate stability.

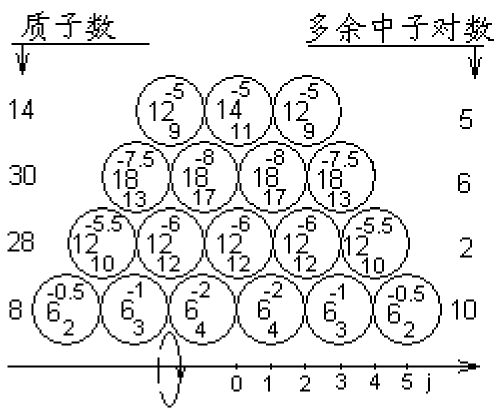
14.4 $\beta^{\pm}$ Electron beam energy calculation example

Within the nucleus

14.4.1 β electronic rays

β Electronic rays appear more number of neutrons in the isotope. Nucleus each to launch a β electronics, nuclear power charge increases the number 1. We in $^{208}_{81}Tl \rightarrow ^{208}_{82}Pb + \beta^{-} + \gamma$, for example, because the author did not refer to the relevant $^{208}_{81}Tl$ magnetic moment of a nucleus value, and the number of protons and $^{194}_{79}Au$ nucleus, neutron is an odd number, so, according to figure 13.2, $^{208}_{81}Tl$ magnetic moment of a nucleus, also take 0.07325 U_p.

$^{208}_{81}Tl$ Atomic experimental determination of total energy is 207.982019 u, K_{a2} layer electronic ionization energy 70820 ev. By (11.3), to: $\sum {}^{208}_{81}TlW_0$ = 3.452989435 x 10 $^{-25}$ kg. Magnetic moment synthesis scheme see (13.2), the energy increment for $\Delta\overline{m}$ = 6.0811736 x 10 $^{-30}$ kg. Design $^{208}_{81}Tl$ nucleus internal structure is shown in figure 14.6, the nuclear force balance test results shown in table 14.5.



Va_{8} Vb^{8}_{-4} Vc^{4}_{6} Vd^{10}_{-2} Ve^{8}_{12} Vf^{20}_{-6}

Vg^{14}_{4} Vh^{18}_{24} Vi^{42}_{-1} Vj^{41}_{-12} Vk^{29}_{20} Vl^{49}_{34}

Vm^{83}_{-11} Vn^{72}_{-16} Vo^{56}_{26} Vp^{82}_{-15} Vq^{67}_{11} Vr^{78}_{18}

Vs^{96}_{-5} Vt^{91}_{-10}

$$W_e = 1.524426978 \times 10^{-27} Kg$$
$$W_b = 1.218929001 \times 10^{-29} Kg$$
$$\sum {}^{208}_{81}TlW_1 = 3.45298393 \times 10^{-25} Kg$$

图 14.6 $^{208}_{81}Tl$ 原子核内核子、净剩 $\pi^{\pm}$ 介子分配示意图

According to section 14.2 β electronic ray emission mechanism is discussed. Set up as shown in figure 14.6, the parent nucleus by $^{208}_{81}Tl$ state began to β decay, and by the lowest energy of $\pi^{\pm}$ in the launch. Starting from a low-energy $t\pi_{d4}^{\pm}\rightarrow r\pi_{g4}^{+}+\beta^{-}+\gamma(\upsilon)$, if we don't consider electron kinetic energy, neutrino(υ) hormone called or photon γ energy, while the table 13.3 to: $\Delta\overline{M}$ =3.20680973 x 10 $^{-30}$ kg. Electric and magnetic energy parameters are as follows:

$$\ldots\ldots \overset{78}{\underset{19}{Vr}}\ \overset{97}{\underset{-5}{Vs}}\ \overset{92}{\underset{-10}{Vt}}\qquad W_e = 1.551134156\times10^{-27}\,Kg$$

$$W_b = 1.219994669\ \times10^{-29}\,Kg$$

$$\sum {}^{208}_{82}PbW_3 = 3.45321904\times10^{-25}\,Kg$$

${}^{208}_{81}Tl$ Nucleus kernel force balance test results list 14.5 (14.6)

To

j / N_a	1	2	3	4	5	nuclearElectric and magnetic field force ccumulated	
58 $F_{e\theta}$ $F_{b\theta}$		t. 417.1960228 -371.2303775				↑	-44.24675164
34 $F_{e\theta}$ $F_{b\theta}$	n. 888.2357196 -1222.642839		p. 1130.857688 -1146.227662				-90.21239694
16 $F_{e\theta}$ $F_{b\theta}$		j. 1149.598326 -943.7382342		m. 101.7291581 -865.0933814			-74.84242294
$F_{e\theta}$ 34/13$F_{b\theta}$ $\Delta F_{\theta b}$	b. 352.2356112 -57.06223088 -45.96426662		d. 360.3313781 -28.53111544 -95.75888879		i. 138.6064441 -7.13277886 -134.0624443		482.6617085

compared to: son nuclear mother and decay products total energy is greater than 3.246461415 x 10^{-29} kg, violation of the law of conservation of total energy, so won't happen.

If by ${}^{208}_{81}Tl$, as shown in the figure 14.6, the parent nucleus through internal $\pi^{\pm}$ mesons, neutron comprehensive adjustment to ${}^{208}_{(82)}Pb$ nuclear excited states, to launch a β electronic after completely into ${}^{208}_{82}Pb$ nucleus, as shown in the figure 11.3, is the fourth layer of particles spiral loop:

$t\,\pi^{\pm}\rightarrow r\,\pi^{+}+\beta^{-}+\gamma(\upsilon)$

By figure 11.3 shows, excited states of electric and magnetic energy parameters are as follows:

$$\ldots\ldots\ldots \overset{80}{\underset{15}{Vr}}\ \overset{95}{\underset{-6}{Vs}}\ \overset{89}{\underset{-8}{Vt}}\qquad W_e = 1.522497937\times10^{-27}\,Kg$$

$$W_b = 9.803396807\times10^{-30}\,Kg$$

$$\sum {}^{208}_{(82)}PbW = 3.452627495\times10^{-25}\,Kg$$

Compared to: $\sum {}^{208}_{(82)}PbW$ state of total energy less than the total energy of the ultimate stability of the sub nuclear $\sum {}^{208}_{82}PbW_3$, △W=2.66898609×10^{-29}Kg, so, this split decay also won't happen.

To sum up, the nucleus of the particle ray is not limited to the initial state of the parent nucleus or nuclear excited states to launch. It should be in the female nuclear sub nuclear transformation to decay, internal $\pi^{\pm}$ mesons, neutron distribution state fully adjust some process with nuclear power, interval to launch. Particle emission and total energy $\sum W_i$ should be equal, and in between mother and son kernel total energy, this is the book chapter 13 γ ray spectrum calculations using mother nuclear energy for the cause of the reference standard.

According to the experimental determination of the β$^-$ ray's energy and stability of nuclear energy state of ${}^{208}_{82}PbW$ as shown in figure 11.3, the simulation calculation was: as shown in the figure 14.7 ${}^{208}_{81}Tl$ nuclei with nuclear power in the process of decay, is the ideal firing interval.

To: $\overline{m}^{\pm}_{g2} \rightarrow \overline{m}^{\pm}_{g1}$, **to:** $\sum {}^{208}_{81}TlW_3$ =3.45294119×10^{-25}Kg

When it s position to launch a β$^-$ electronic, through:

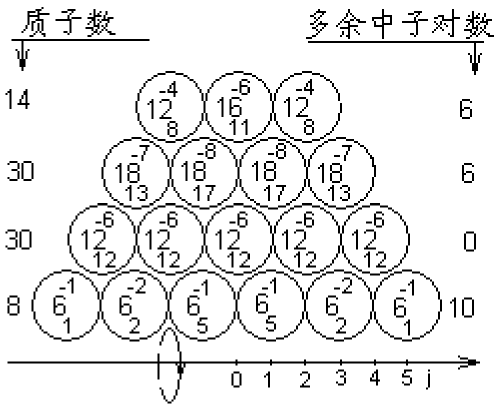
$s\pi^{\pm}\rightarrow q\pi^{+}+\beta^{-}+\gamma(\upsilon)$; $\overline{m}^{\pm}_{g1} \rightarrow \overline{m}^{\pm}_{g2}$;

Certainly a to c position high-energy π_{g1}^{+} diffusion adjustment: $2a\pi^{+}\rightarrow 2c\pi^{+}$;

Three process coordination at the same time, we can finish the β$^-$ electron emission, ${}^{208}_{81}Tl$ with nuclear power, it is converted into the stability of the sub nuclear ${}^{208}_{82}Pb$, as shown in figure 11.3. Please note: if we will $s\pi^{\pm}\rightarrow q\pi^{+}+\beta^{-}+\gamma$ (υ)hormone called were closed up alone, the resulting electron kinetic energy is:

$\Delta\overline{m}$ =3.20680973×10^{-30}Kg=1.798888Mev

If regardless of neutrinos or photon energy, with the experimental value 1.7950 Mev (50%) of the energy level are consistent.



$\underset{10}{Va}$ $\overset{10}{\underset{-2}{Vb}}$ $\overset{8}{\underset{4}{Vc}}$ $\overset{12}{\underset{-4}{Vd}}$ $\overset{8}{\underset{12}{Ve}}$ $\overset{20}{\underset{-6}{Vf}}$

$\overset{14}{\underset{2}{Vg}}$ $\overset{16}{\underset{24}{Vh}}$ $\overset{40}{\underset{-2}{Vi}}$ $\overset{38}{\underset{-12}{Vj}}$ $\overset{26}{\underset{24}{Vk}}$ $\overset{50}{\underset{34}{Vl}}$

$\overset{84}{\underset{-12}{Vm}}$ $\overset{72}{\underset{-16}{Vn}}$ $\overset{56}{\underset{26}{Vo}}$ $\overset{82}{\underset{-14}{Vp}}$ $\overset{68}{\underset{11}{Vq}}$ $\overset{79}{\underset{16}{Vr}}$

$\overset{95}{\underset{-6}{Vs}}$ $\overset{89}{\underset{-8}{Vt}}$

$$W_e = 1.542121382 \times 10^{-27} Kg$$
$$W_b = 9.803396811 \times 10^{-30} Kg$$
$$\sum {}^{208}_{81}TlW_2 = 3.45282373 \times 10^{-25} Kg$$

图 14.7 $^{208}_{81}Tl$ 原子核内核子、净剩

$\pi^{\pm}$

介子分配示意图

Because the nucleus is a whole consists of electric and magnetic field of the total energy system. Within a particu lar location of $\pi^{\pm}$mesons, neutron distribution state of adjustment will lead to energy change. This adjustment is not limited to a certain location, a certain steps; multiple steps can be more than one location, at the same time. It is lead to particle γ ray, the diversification and complication of the rays.

Book on nuclear spin direction of magnetic energy is using simplified way solenoid magnetic field calculation, not considering the spin axis charge density changes in the current intensity and magnetic field strength of the change. Electronic total energy in the atomic lining also is too. Although magnetic field total energy generally accounts for only a nucleus total energy enough of a few, do not affect the nucleus of the total energy of the precision, but it can affect particle γ rays, the radiation energy simulation precision, please forgive me.

14.4.2 β^{+} electronics and ε track electronic capture

β^{+} Electronics and ε track electronic capture of the role of nucleus, as this is quite a part of the nucleus at the same time with these two phenomena decay. The total number of nuclear remain unchanged, the parent nucleus nuclear power charge number 1. Equivalent nuclear within a proton into neutrons, decay reaction equation of particles can be expressed as:

$$\begin{cases} \beta^{+}: \quad \pi_g^{+} + 4v \rightarrow \pi_d^{\pm} + \beta^{+} & (14.6-1) \\ \varepsilon: \quad \pi_g^{+} + v + \beta^{-} \rightarrow \pi_d^{\pm} & (14.6-2) \end{cases}$$

To $^{194}_{79}Au \rightarrow ^{194}_{78}Pt + \beta^{+}$ decay process as an example, the mother nuclear, internal structure, energy, parameter calculation value is shown in figure 13.2, table 13.1 and figure 13.3 and table 13.2. If decay is in energy change at least 4 layer particles spiral ring outside r, t happen, by table 13.3 of each layer, low $\pi^{\pm}$ muon original wave energy, and the equations (14.6), calculate particle decay energy increment in the process of transformation, respectively:

$$\Delta \overline{m}_{\beta 4} = 5.02868767 \times 10^{-30} \text{Kg} \quad \Delta \overline{m}_{\varepsilon 4} = 3.20680973 \times 10^{-30} \text{Kg}$$

(Temporary not consider electron kinetic energy, the photon or neutrino energy)

If directly from $^{194}_{79}Au$ nucleus, as shown in the figure 13.2 r, t location β^{+} electronic decay, the electric and magnetic energy parameters are:

$$\ldots\ldots\ldots \overset{74}{\underset{23}{Vr}} \quad \overset{97}{\underset{-7}{Vs}} \quad \overset{90}{\underset{-12}{Vt}} \qquad W_e = 1.375543122 \times 10^{-27} Kg$$

$$W_b = 7.817404549 \times 10^{-30} Kg$$

$$\sum {}^{194}_{78}PtW_2 = 3.220039883 \times 10^{-25} Kg$$

Less than the son, as shown in the figure 13.3 nuclear $\sum {}^{194}_{78}PtW_1$ values to 1.7405427 x 10^{-29} kg, so, the decay phenomenon won't happen.

Similarly, if by radiation in the $^{194}_{(78)}Pt$ excited states, as shown in the figure 13.3, electricity, magnetic energy parameters is:

$$\ldots\ldots\ldots \overset{74}{\underset{19}{Vr}} \quad \overset{93}{\underset{-4}{Vs}} \quad \overset{89}{\underset{-10}{Vt}} \qquad W_e = 1.418615891 \times 10^{-27} Kg$$

$$W_b = 9.484283676 \times 10^{-30} Kg$$

$$\sum {}^{194}_{(78)}PtW_3 = 3.220521571 \times 10^{-25} Kg$$

Greater than mother nuclear energy $\sum {}^{194}_{79}AuW_1$ values 2.74095268 x 10^{-29} kg, obviously, this until finally excited states radiation β^{+} electronic phenomenon won't happen.

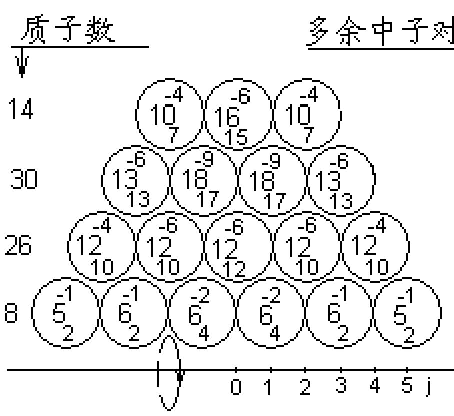


图 14.8 $^{194}_{79}Au$ 原子核内核子、净剩 $\pi^{\pm}$ 介子分配示意图

Va_{8} $\overset{8}{\underset{-4}{Vb}}$ $\overset{4}{\underset{4}{Vc}}$ $\overset{8}{\underset{-2}{Vd}}$ $\overset{6}{\underset{12}{Ve}}$ $\overset{18}{\underset{-6}{Vf}}$

$\overset{12}{\underset{4}{Vg}}$ $\overset{16}{\underset{20}{Vh}}$ $\overset{36}{\underset{-2}{Vi}}$ $\overset{34}{\underset{-12}{Vj}}$ $\overset{22}{\underset{20}{Vk}}$ $\overset{42}{\underset{34}{Vl}}$

$\overset{76}{\underset{-8}{Vm}}$ $\overset{68}{\underset{-18}{Vn}}$ $\overset{50}{\underset{26}{Vo}}$ $\overset{76}{\underset{-12}{Vp}}$ $\overset{64}{\underset{15}{Vq}}$ $\overset{79}{\underset{14}{Vr}}$

$\overset{93}{\underset{-6}{Vs}}$ $\overset{87}{\underset{-8}{Vt}}$

$$W_e = 1.400149869 \times 10^{-27}\,Kg$$
$$W_b = 9.484283679 \times 10^{-30}\,Kg$$
$$\sum {}^{194}_{79}AuW_3 = 3.220245447 \times 10^{-25}\,Kg$$

So, we should still in the process of ${}^{194}_{79}Au \rightarrow {}^{194}_{78}Pt + \beta^+$ nucleus decays with nuclear power, in the transition of β^+ electron emission of the mother. With experimental determination of β^+ electron kinetic energy and stability of the internal structure of nuclear as shown in figure 13.3, energy as reference standard, the simulation calculation of ${}^{194}_{79}Au$, launch β^+ electronic before and after the parent nucleus with the structure of the nuclear power, see figure 14.8 and figure 14.9.

β^+ the high-energy electron emission process and related π_g^+ muon change adjustment process is as follows:

$q\pi^+ + 4v \rightarrow s\pi^{\pm} + \beta^+$、$4k\pi^+ \rightarrow 4h\pi^+$、$2o\pi^+ \rightarrow 2l\pi^+$、$2q\pi^+ \rightarrow 2r\,\pi^+$

Because β^+ positron emission process to continuously absorb four neutrinos, nature must have a process, so the back three high-energy π_g^+ violation adjustment procedures can be carried out together. By the total energy conservation, electron kinetic energy is W_{ev}, to:

$$W_{ev} = \sum {}^{194}_{79}AuW_3 - \sum {}^{194}_{78}PtW_3 - m_{e0} = 1.226553Mev$$

Experimental value is 1.230 Mev, agreement is very good.

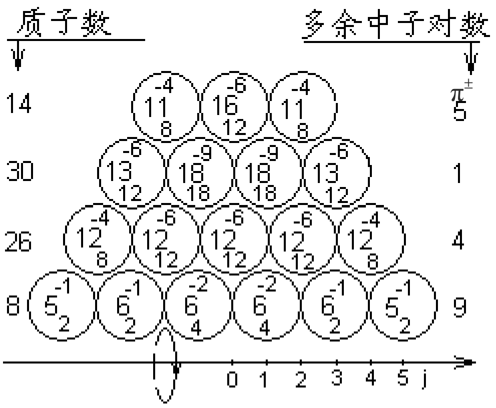


图 14.9 ${}^{194}_{78}Pt$ 原子核内核子、净剩介子分配示意图

$$\underset{8}{Va} \quad \overset{8}{\underset{-4}{Vb}} \quad \overset{4}{\underset{4}{Vc}} \quad \overset{8}{\underset{-2}{Vd}} \quad \overset{6}{\underset{12}{Ve}} \quad \overset{18}{\underset{-6}{Vf}}$$

$$\overset{12}{\underset{4}{Vg}} \quad \overset{16}{\underset{24}{Vh}} \quad \overset{40}{\underset{-2}{Vi}} \quad \overset{38}{\underset{-12}{Vj}} \quad \overset{26}{\underset{16}{Vk}} \quad \overset{42}{\underset{36}{Vl}}$$

$$\overset{78}{\underset{-8}{Vm}} \quad \overset{70}{\underset{-18}{Vn}} \quad \overset{52}{\underset{24}{Vo}} \quad \overset{76}{\underset{-12}{Vp}} \quad \overset{64}{\underset{12}{Vq}} \quad \overset{76}{\underset{16}{Vr}}$$

$$\overset{92}{\underset{-6}{Vs}} \quad \overset{86}{\underset{-8}{Vt}}$$

$$W_e = 1.392944360 \times 10^{-27} Kg$$

$$W_b = 9.474618808 \times 10^{-30} Kg$$

$$\sum {}_{78}^{194}PtW_3 = 3.220214472 \times 10^{-25} Kg$$

Can be seen from the above analysis and calculation, we through the simulation although only find a group of electronic kinetic parameters, and there are small error, but in the current level of knowledge, have enough problems. If $\sum {}_{79}^{194}AuW_0$ 、 $\sum {}_{78}^{194}PtW_0$ laboratory in section 13.2 the energy calculation, the difference between, minus the static energy m_{eo}, maximum 1.3336 Mev electron kinetic energy, still less than the largest 1.487 Mev electron kinetic energy experimental value, it is regardless of the γ ray energy. Obviously, it is mainly composed of with nuclear power, solenoid magnetic energy simplified calculation and atomic inner electronic total energy caused by the change of the error.

15 the energy under the condition of the relativistic electron spin elliptical orbit equations of motion

15.1 Is far lower than the speed of light under the condition of electron spin elliptical orbit equations of motion

15.1.1 Electron spin elliptical orbit characteristics

Electronics in the nucleus as the center under the action of electric field force along the spin elliptical orbit characteristics, which is similar to Newton's mechanics in the sun, the earth is the center of gravity field under the action of the elliptical orbit, and has the following features:

1. The interactions between the planets in the solar system are still the gravity, so the planets can distribution in almost the same spin elliptical orbit plane. Electronic is the interaction between electric field repelling force, make every electronic in nucleus and electronic integrated under the action of electric field force between different spin elliptical orbit plane respectively. Nucleus is located in the same focus of each electron spin elliptical orbit. Each electron spin elliptical orbit as repelling force between electric field, magnetic field lateral force, there will always be around their respective spin axis elliptical orbit additional rotation, rotating ellipsoid surface formation, which is the scientific community has been observed by experiment "s, p, d, f type electron hull shell".

2. Earth or other planets along the spin elliptical orbit around the sun when there is no spin quantum number $N_{\theta i}$ value problem, $N_{\theta i}$ value is 1. Each electron around the nucleus along the spin elliptical orbit, $N_{\theta i} \geq 1$ of is natural number or simple points.

3. Earth around the sun along the spin elliptical orbit, the speed is far less than the speed of light c, need not consider speed caused by the energy relativity quality effect. Electronic itself the wave speed of v_a to the speed of light, the spin velocity $v_{\theta i}$ also is much bigger than the planet, especially heavy atoms of inner electrons, the spin velocity $v_{\theta i}$ most close to 0.7 c. The spin velocity of its quality and electric field strength has significant energy relativistic effects.

4. Sun to the earth's gravity, for both qualities is the same, other planets influence each other lesser, and gravity size only with spin movement orbit of the earth around the sun is inversely proportional to the square of the radius. Nucleus of each electronic the nuclear field of gravity, because of the numerous electronic shielding effect, the comprehensive strength of electric field the charge coefficient Z_i is a fairly complex variables. Range between 1 ~ 5 times, will make the electric field force of multivariable functions.

Comprehensive the above features, will make the electron spin elliptical orbit is quite complicated, even serious deformation. Because of this, we have to atomic physics is divided into two parts: the first part discuss the energy under the condition of the relativistic electron spin elliptical orbit equations of motion, it can solve the atomic outer, outer electron spin elliptical orbit characteristics of atoms form, size, electronic gradually ionization or warp absorption and emission spectra of each level. "S, p, d, f type electron hull shell" forming principle; The second part discuss the energy under the condition of the relativistic electron spin elliptic orbit characteristics, the corresponding each level of X-ray energy calculation; It can solve the atomic inner K, L layer many combination electron orbital motion characteristics.

15.1.2 Is far lower than the speed of light under the condition of Electron spin elliptical orbit equations of motion

For light and heavy atoms of outer, outer single electronics, because spin speed is far less than the speed of light, so don't consider energy under the premise of the theory of relativity, to simplify the analysis. Pay by electronic rest mass m_{eo} on behalf of the low speed spin of electrons movement quality of m_e; At the same time, we assume that the electronic integrated intensity of the electric charge coefficient Z_i is the same, or change is very small, within the permitted error; Don't consider the wave motion of electronic, when the electronic wave radius R_a and radius of nuclei are far smaller than the electron spin elliptical orbit radius R_0, we could bring the electron and the nucleus as a two particles.

When electron around the nucleus along the elliptical orbit for spin, due to the effect of electric field force between attracts each other, the nucleus will be relatively electronic for weak movement. By theoretical mechanics that: electron spin movement should be equal to the quality of the quality $m_{eo}K_m$ said. $m_{eo}K_m=Mm_{eo}/(M+ m_{eo})$, M for the quality of the nucleus. K_m only the outer single atom electronic makes sense. In this paper, only the three kinds of hydrogen, helium and lithium atoms consider correction coefficient:

^1_1H ： Km= 0.9994556793 ^4_2He ： Km= 0.9998629254 ^7_3Li ： Km= 0.9999218102

Other atoms or economical paired electrons K_m=1.

By book equations (1.2) and Newton's mechanics, coulomb's law, see figure 15.1, electron around the nucleus along the spin elliptical orbit equations of motion for:

$$\begin{cases} R_\theta = \dfrac{N_{\theta i} h}{2\pi m_{e0} K_m v_\theta} & (15.1-1) \\ m_{e0} K_m (\ddot{R}_\theta - R_\theta \dot{\theta}^2) = \dfrac{-Z_i e^2}{4\pi\varepsilon_0 R_\theta^2} & (15.1-2) \\ m_{e0} K_m (R_\theta \ddot{\theta} + 2\dot{R}_\theta \dot{\theta}) = 0 & (15.1-3) \end{cases}$$

To compared with equations (1.2), (15.1-1) - more than just a spin quantum number $N_{\theta i}$. Was neils Bohr atom spectrum model derived from the application of the quantum number in neutral departments, won the Nobel Prize for physics in 1922, its significance self-evident, here no longer. (15.1-2), (15.1 3) two type of learned Newtonian mechanics and classical electrodynamics people know that law of universal gravitation is quoted to the coulomb's law within the atoms. (15.1-1) is the electronic in the nucleus and all other electronic integrated under the action of electric field force along the spin elliptical orbit, the quantization of momentum conservation equation. When momentum is constant, electronic and atomic nuclei, other electronic integrated electric field force along the spin of the resultant force will orbit radius pointing to the center of the nucleus. Equations is proved by the law of universal gravitation and (1.2), (15.1-1) type of momentum $N_{\theta i}h$ for constant, so, (15.1-2), (15.1 3) type.

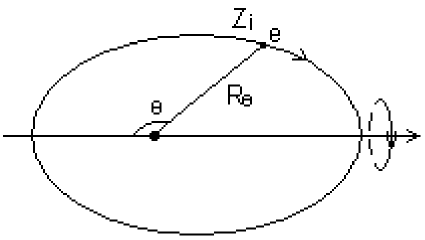


Figure 15.1 electron spin orbit around the nucleus

By (15.1 1), the electronic movement of the spin angular velocity $\dot{\theta}$ for:

$$\dot{\theta} = \frac{v_\theta}{R_\theta} = \frac{N_{\theta i} h}{2\pi m_{e0} K_m R_\theta^2} \qquad (15.2)$$

Make $R_\theta=1/u$, to $dR_\theta=-du/u^2$, generation into (15.2), to:

$$\dot{\theta} = \frac{N_{\theta i} h}{2\pi m_{e0} K_m} u^2 \qquad (15.3)$$

By figure 15.1, (15.3), electronic v_r ($\dot{R}_\theta$) of the radial velocity and acceleration a_r ($\ddot{R}_\theta$), respectively:

$$v_r = \frac{dR_\theta}{d\theta}\dot{\theta} = -\frac{N_{\theta i}h}{2\pi m_{e0}K_m}\frac{du}{d\theta} \quad (15.4)$$

$$\alpha_r = -\frac{N_{\theta i}h}{2\pi m_{e0}K_m}\frac{du^2}{d\theta^2}\dot{\theta} = -\left(\frac{N_{\theta i}h}{2\pi m_{e0}K_m}\right)^2 u^2\frac{du^2}{d\theta^2} \quad (15.5)$$

To (15.4), (15.5) into (15.1-2) type checking:

$$\frac{du^2}{d\theta^2} + u = \frac{Z_i K_m}{N_{\theta i}^2 r_0} \quad (r_0 = \frac{h}{2\pi m_{e0}a_c c} \quad a_c = \frac{e^2}{2h\varepsilon_0 c}) \quad (15.6)$$

Solution (15.6) decays differential equations:

$$R_\theta = \frac{N_{\theta i}^2 r_0}{Z_i K_m(1+E_\theta\cos\theta)} \quad (15.7)$$

This is everyone acquaint with of conical section line orbital motion equation. In all atoms, electronic by comprehensive electric field force is attractive, electronic ionization energy is negative, so,$0\leq E_\theta \leq 1$, the equation says electronic along the spin elliptical orbits around the nucleus of the elliptic equations.

By (15.1 1), (15.2) and (15.7), electronic along radius direction, the spin direction and the tangent velocity v_{ri}, $v_{\theta i}$, v_{ei} respectively:

$$\begin{cases} v_{ri} = \frac{Z_i a_c c}{N_{\theta i}}E_{\theta i}\sin\theta & (15.8-1) \\ v_{\theta i} = \frac{Z_i a_c c}{N_{\theta i}}(1+E_{\theta i}\cos\theta) & (15.8-2) \\ v_{ei} = \frac{Z_i a_c c}{N_{\theta i}}\sqrt{1+2E_{\theta i}\cos\theta + E_{\theta i}^2} & (15.8-3) \end{cases}$$

Subscript "$_i$" said electronic along different spin elliptical orbit, (the same below). Electronic along different spin elliptical orbit the kinetic energy of W_{mi}, from equations (15.8) and Newton's mechanics have to:

$$W_{mi} = \frac{m_{e0}K_m}{2}\left(\frac{Z_i a_c c}{N_{\theta i}}\right)^2(1+2E_{\theta i}\cos\theta + E_{\theta i}^2) \quad (15.9)$$

Electronic along the spin elliptical orbit, the nucleus and other electronic integrated under the action of electric potential can W_{ei}, by Coulomb's law and (15.7), to:

$$W_{ei} = \frac{-Z_i e^2}{4\pi\varepsilon_0 R_{\theta i}} = -\left(\frac{Z_i a_c c}{N_{\theta i}}\right)^2 m_{e0}K_m(1+E_{\theta i}\cos\theta) \quad (15.10)$$

Atomic electric field outside or foreign energy under the action of an electronic ionization energy ΔW_{ei}, apparently because of its kinetic energy and potential can be combined. By (15.9), (15.10), may (after convenient for calculation, we all take positive)

$$\Delta W_{ei} = \frac{m_{e0} K_m}{2} \left(\frac{Z_i a_c c}{N_{\theta i}} \right)^2 (E_{\theta i}^2 - 1) \qquad (15.11)$$

By (15.11), can see: electronic ionization energy only with spin comprehensive electric field of elliptic orbit charge intensity coefficient Z_i, spin quantum number of $N_{\theta i}$ and elliptical orbit parameters eccentricity of $E_{\theta i}$, and its position in orbit $R_{\theta i(\theta)}$ has nothing to do.

If we change a way of expression, by (15.7), to $\theta = 0, \pi$, the spin axis elliptical orbit $A_{\theta i}$ is:

$$A_{\theta i} = \frac{N_{\theta i}^2 r_0}{\overline{Z}_i K_{mi} (1 - E_{\theta i}^2)} \quad (\overline{Z}_i \text{ for the spin track on the average}) \qquad (15.12)$$

Will type (15.12) into (15.11), to:

$$\Delta W_{ei} = m_{e0} (a_c c)^2 \frac{r_0 \overline{Z}_i}{2 A_{\theta i}} \qquad (15.13)$$

Type shows that electronic ionization energy and comprehensive strength of electric field the charge only average coefficient of $\overline{Z}_i$ and elliptical orbit long axis $A_{\theta i}$, the nature of the law of universal gravitation and the same is familiar to most readers.

15.2 Rate of elliptical orbit centrifugal $E_{\theta i}$ solution

15.2.1 An electron transition in the process of energy conservation Principle

From particle physics sections in the book we have proved that the fluctuations of the photon, spin velocity is the speed of light. The photon wave particle duality characteristic, we can write P_γ photon momentum, energy and W_γ wavelength of λ formula:

$$\begin{cases} P_\gamma = \dfrac{h}{\lambda} & (15.14-1) \\ W_\gamma = \dfrac{hc}{\lambda} & (15.14-2) \end{cases}$$

In light of the characteristics of man-made earth satellite launch vehicles and orbit transfer, electronic by low-energy spin elliptical orbit to high orbit transfer must be along as shown in figure 15.2 the abc transfer of elliptical orbit, the energy utilization efficiency can be the biggest. In photonic and electronic collision point a,

θ=0, Z_1=Z_a , the spin velocity increment Δv_e=Δv_θ. By the law of conservation of momentum, momentum and energy increment, (15.11) and (15.14) equations, we have:

$$\begin{cases} \frac{h}{\lambda} = m_{e0} K_m \Delta v_{\theta a} & (15.15-1) \\ \frac{h}{\lambda} R_{\theta a} = m_{e0} K_m (R_{\theta a} v_{\theta a} - R_{\theta 1} v_{\theta 1}) & (15.15-2) \\ \frac{hc}{\lambda} = \frac{1}{2} m_{e0} K_m (v_{\theta a}^2 - v_{\theta 1}^2) & (15.15-3) \\ \frac{hc}{\lambda} = \frac{m_{e0} K_m (Z_1 a_c c)^2}{2} \left(\frac{E_{\theta ac}^2 - 1}{N_{\theta ac}^2} - \frac{E_{\theta 1}^2 - 1}{N_{\theta 1}^2} \right) & (15.15-4) \end{cases}$$

Respectively simultaneous (15.15-1), (15.15-2) and (15.15 3), (15.15-4), (15.7) and (15.8) will be equations into, get the same results:

$$\frac{N_{\theta ac}^2}{1+E_{\theta ac}} = \frac{N_{\theta 1}^2}{1+E_{\theta 1}} \qquad (15.16)$$

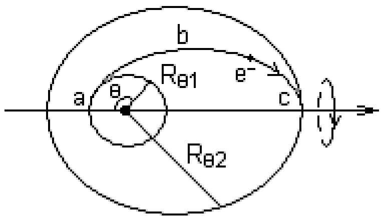


Figure 15.2 electronic excitation of transfer orbit

Along the abc electronic transfer orbit, to spin quantum number $N_{\theta abc}$ and centrifugal rate $E_{\theta abc}$ values are remain the same, at point c and orbit transfer, θ=π,Z_2=Z_c spin elliptical orbit radius should be equal, by (15.7), to:

$$\frac{N_{\theta ac}^2}{1-E_{\theta ac}} = \frac{N_{\theta 2}^2}{1-E_{\theta 2}} \qquad (15.17)$$

Simultaneous (15.16) and (15.17), to:

$$N_{\theta ac} = \frac{\sqrt{2} N_{\theta 1} N_{\theta 2}}{\sqrt{N_{\theta 1}^2 (1-E_{\theta 2}) + N_{\theta 2}^2 (1+E_{\theta 1})}} \qquad (15.18)$$

Chapter 2 elementary particle formation principle of the internal structure and energy we have proved that the photon and neutrinos are composed of a pair of charged particles; Fluctuations, into orbit are cylindrical helical, velocity is the speed of light c; The difference is neutrinos are uhf electromagnetic field excitation is transformed into the photon. Electronic e^- consists of a pair of charged particles and a load of charged particles. In the process of stimulating step by step, only absorbs photon energy, not eventually increase their number of charged particles. When photons and electrons transfer orbit starting point in a collision, the photon will be not only their own momentum transfer to electronics, can adsorption on electronic, will own most of the energy transmitted to the electric and magnetic field, to increase the electron kinetic energy, into orbit transfer. When electronic run to orbit position c point of instant, the residual energy photons will transfer again to electronics, their own at a very low energy of the photon or neutrinos form reverse jet leave, to keep the original number of charged particles. These two kinds of combination can improve the electronic spin speed, again to e^- final orbit. Below to hydrogen atoms in the electronic inspired by $N_{\theta 1} \to N_{\theta 2}$ process as an example, detailed analysis and orbit transfer in the process of spin elliptical orbit parameters change, do it more intuitive and clear.

15.2.2 Electronic excitation, transition in the energy Conservation calculation example

If the electrons within the atoms of hydrogen in the $N_{\theta 1}=1$ ground spin moving in elliptical orbit, the eccentricity of $E_{\theta 1}=0, Z_1=Z_i=1$ is constant. When electrons are high energy photon collision, one-time ionization, the spin track a parabola, the $N_{\theta 2}=\infty, E_{\theta 2}=1$, electronic ionization energy $\triangle W_e$, by (15.11), to:

$$\Delta W_{ei} = \frac{m_{e0} K_m}{2} (Z_i a_c c)^2 \left(\frac{E_{\theta 2}^2 - 1}{N_{\theta 2}^2} - \frac{E_{\theta 1}^2 - 1}{N_{\theta 1}^2} \right) \quad (15.19)$$

The Km = 0.9994556793... Equivalent generation into (15.19), to $\triangle W_{ei}$ = 13.59829196 ev.

If electronic, between $N_{\theta i}$=1~2 first assume that $E_{\theta 1}=E_{\theta 2}=0$, by (15.15-4), electronic should absorption wavelength of the photon λ is:

$$\lambda = \frac{2hc}{m_{e0} K_m (Z_1 a_c c)^2 \left(\frac{E_{\theta 2}^2 - 1}{N_{\theta 2}^2} - \frac{E_{\theta 1}^2 - 1}{N_{\theta 1}^2} \right)} \quad (15.20)$$

The $N_{\theta 1}$=1, $N_{\theta 2}$=2... ...Equivalent generation into (15.20), to: λ=1215.684489A°. The λ values into (15.14-2), the photon energy is obtained: W_γ=10.19871898 ev.

Will be λ value generation (15.15 1) in type, obtained the collision point of the electron spin velocity increment:

$\triangle v_{\theta a}$=5986.633654m/s

By $N_{\theta 1}$=1, $N_{\theta 2}$=2, $E_{\theta 1}=E_{\theta 2}$=0, generation of (15.18) in type, too: $N_{\theta abc}$=1.264911064.

The $N_{\theta abc}$ values into (15.16), to: $E_{\theta abc}$=0.6.

From (15.8-2), electron spin in the collision point a speed increment for $\triangle v_{\theta a}$:

$$\Delta v_{\theta a} = Z_1 a_c c \left(\frac{1+E_{\theta ac}}{N_{\theta ac}} - \frac{1+E_{\theta 1}}{N_{\theta 1}} \right) \qquad (15.21)$$

The $E_{\theta abc}$, $N_{\theta abc}$ equivalent generation into (15.21), to $\triangle v_{\theta a}$ = 579543.6558 m/s.

It is (15.15 1) of the law of conservation of momentum and the velocity increment of 96.8 times. Similarly, by (15.15 3) type, too: electronic new kinetic energy $\triangle W_{ma}$ = 8.158975179 ev, is 1.5913 times of the former!

When electronic along the abc transfer orbit to point c, θ=π. By (15.8-2), the spin velocity $v_{\theta c}$ for:

$$v_{\theta c} = Z_1 a_c c \left(\frac{1-E_{\theta ac}}{N_{\theta ac}} \right) \qquad (15.22)$$

Will $E_{\theta abc}$=0.6, $N_{\theta abc}$=1.264911064 generation into (15.22), to: $v_{\theta c}$=691808.7631m/s. Similarly, by (15.22), to: orbit in the speed at point c $v_{\theta 2}$=1093845.698m/s, is $v_{\theta c}$ 1.58 times. So, electronic at point c to orbit transfer, still need to provide residual energy photon. By (15.15 3) type, is c at orbit transfer need energy for $\triangle W_{mc}$:

$$\Delta W_{mc} = \frac{1}{2} m_{e0} K_m (v_{\theta 2}^2 - v_{\theta c}^2) \qquad (15.22)$$

The $v_{\theta 2}$, $v_{\theta c}$ data into (15.23), to: $\triangle W_{mc}$=2.039743792ev, and was equal to the sum of the $\triangle W_{ma}$ (15.14-2) type in all the photon energy W_r. That the abc transfer orbit energy utilization rate is 100%. (In the c of photons or neutrinos reverse jet out remaining low energy ignored).

Through analyzing the above calculation results, we have to the photon energy is divided into two parts: the first part is the kinetic energy of the photons, and electronic collision followed the momentum and the law of momentum conservation, behind the calculation that it will increase the electron spin elliptical orbit of centrifugal rate; Second part for electric and magnetic energy photon itself, most of the total energy, it will be attached to the electronic form, quality to provide an electron transfer process in the orbit at a, c and orbit transfer moment for the main kinetic energy.

(This section the following content of electronic spin elliptical orbit of centrifugal rate $E_{\theta i}$ derivation and calculation process is very complicated, relationship with the main content is not big, and readers can jump over it.)

In the scientific community existing experiment, testing level, also cannot be directly measured atomic internal each electron spin elliptical orbit radius of eccentricity of $E_{\theta i}$ and $R_{\theta i}$ ... ... Parameters such as. Book, therefore, at present only from electronic ground ionization energy $\triangle W_{eo}$ test value or absorption, emission spectrum energy W_γ , and by the law of conservation of energy, (15.11), (15.14-2), (15.15-4), to simulate calculation of each electron spin movement elliptical orbit of eccentricity of $E_{\theta i}$:

$$E_{\theta i}=\sqrt{1+N_{\theta i}^2\left[\frac{2h}{m_{e0}K_{mi}\lambda(Z_i a_c)^2 c}+\frac{E_{\theta 1}^2-1}{N_{\theta 1}^2}\right]} \qquad (15.24)$$

$N_{\theta 2}$=2 in the hydrogen atoms of $E_{\theta 2}$ value, the experimental value of λ=1215.68 A° generation in (15.24), to $E_{\theta 1}$=0, to, $E_{\theta 2}$= 0.003328476546

If the electronic transfer along the rail abc stimulated or Z_i a tiny change in the process of transition, is still by (15.11), (15.14-2), (15.15-4), the spin of electrons shillings quantum number $N_{\theta abc}$ is constant, only eccentricity of $E_{\theta a}\rightarrow E_{\theta c}$ tiny changes:

$$\begin{cases}\dfrac{hc}{\lambda}=\dfrac{1}{2}m_{e0}K_m(Z_1 a_c c)^2\left[\dfrac{E_{\theta a}^2-1}{N_{\theta ac}^2}-\dfrac{E_{\theta 1}^2-1}{N_{\theta 1}^2}\right] & (15.25-1)\\ \dfrac{hc}{\lambda}=\dfrac{1}{2}m_{e0}K_m(a_c c)^2\left[\left(\dfrac{Z_2}{N_{\theta ac}}\right)^2(E_{\theta ac}^2-1)-\left(\dfrac{Z_1}{N_{\theta 1}}\right)^2(E_{\theta 1}^2-1)\right] & (15.25-2)\end{cases}$$

Solution (15.25) equations have to:

$$E_{\theta c}=\sqrt{\left(\frac{Z_1}{Z_2}\right)^2(E_{\theta a}^2-1)+1} \qquad (15.26)$$

In transfer orbit at point a, photonic and electronic collision, by (15.16), (15.21), electron spins velocity increment $\triangle v_{\theta a}$ for:

$$\Delta v_{\theta a}=Z_1 a_c c\left(\frac{1+E_{\theta 1}}{N_{\theta 1}}\right)\left(\frac{N_{\theta a}}{N_{\theta 1}}-1\right) \qquad (15.27)$$

By (15.15-1), (15.15-4) type, only the photon momentum collision impact on electron spin speed for:

$$\begin{cases}\dfrac{hc}{\lambda}=m_{e0}K_m\Delta v_{\theta a}c & (15.28-1)\\ \dfrac{hc}{\lambda}=\dfrac{1}{2}m_{e0}K_m(a_c c)^2\left[\left(\dfrac{Z_2}{N_{\theta 2}}\right)^2(E_{\theta 2}^2-1)-\left(\dfrac{Z_1}{N_{\theta 1}}\right)^2(E_{\theta 1}^2-1)\right] & (15.28-2)\end{cases}$$

Simplified as:

$$\Delta v_{\theta a}=\frac{a_c^2 c}{2}\left[\left(\frac{Z_2}{N_{\theta 2}}\right)^2(E_{\theta 2}^2-1)-\left(\frac{Z_1}{N_{\theta 1}}\right)^2(E_{\theta 1}^2-1)\right] \qquad (15.29)$$

Simultaneous (15.27) and (15.29), to $\triangle N_{\theta a}=N_{\theta a}-N_{\theta}$, too:

$$\Delta N_{\theta a}=\frac{a_c\left[\left(\frac{Z_2 N_{\theta 1}}{N_{\theta 2}}\right)^2(E_{\theta 2}^2-1)-Z_1^2(E_{\theta 1}^2-1)\right]}{2Z_1(1+E_{\theta 1})} \qquad (15.30)$$

Similarly, when the electron orbit at c, $\theta_2=\pi$, a photon residual energy of electron spin elliptical orbit quantum number incremental $\triangle N_{\theta c}$, according to equations (15.28), (15.27), to:

$$\begin{cases}\Delta v_{\theta c}=\dfrac{a_c^2 c}{2}\left[\left(\dfrac{Z_2}{N_{\theta 2}}\right)^2(E_{\theta 2}^2-1)-\left(\dfrac{Z_1}{N_{\theta ac}}\right)^2(E_{\theta ac}^2-1)\right] & (15.31-1)\\ \Delta v_{\theta c}=Z_2 a_c c\left(\dfrac{1-E_{\theta 2}}{N_{\theta 2}}\right)\left(1-\dfrac{N_{\theta c}}{N_{\theta 2}}\right) & (15.31-2)\end{cases}$$

Solution (15.31) equations, the $\triangle N_{\theta c}=N_{\theta 2}-N_{\theta c}$ to:

$$\Delta N_{\theta c}=\frac{a_c\left[Z_2^2(E_{\theta 2}^2-1)-\left(\frac{Z_1 N_{\theta 2}}{N_{\theta ac}}\right)^2(E_{\theta ac}^2-1)\right]}{2Z_2(1-E_{\theta 2})} \qquad (15.32)$$

By (15.16), (15.17), because of the electron spin quantum number incremental $\triangle N_{\theta a}$, $\triangle N_{\theta c}$ to spin elliptical orbit centrifugal rate increment $\triangle E_{\theta a}$, $\triangle E_{\theta c}$ for:

$$\begin{cases}\Delta E_{\theta a}=\left[\left(\dfrac{N_{\theta a}}{N_{\theta 1}}\right)^2-1\right](1+E_{\theta 1}) & (15.33-1)\\ \Delta E_{\theta c}=\left[1-\left(\dfrac{N_{\theta c}}{N_{\theta 2}}\right)^2\right](1-E_{\theta 2}) & (15.33-2)\end{cases}$$

Clearly:

$$E_{\theta 2}=E_{\theta 1}+\triangle E_{\theta a}+\triangle E_{\theta c} \qquad (15.34)$$

Detailed calculation procedure is as follows:

1. Shillings $N_{\theta 1}=1$, $N_{\theta 2}=2$, $E_{\theta 1}=E_{\theta 2}=0$, generation of (15.18) in type, find $N_{\theta abc}$values.

2. Will $N_{\theta abc}$ equivalent generation into (15.16), and $E_{\theta abc}$ values. When Z_a, Z_c change, by (15.26), respectively for $E_{\theta a}$, $E_{\theta c}$ values.

3. The related parameter generation into (15.30), (15.32), respectively, for $\triangle N_{\theta a}$, $\triangle N_{\theta c}$ values.

4. The values of $\triangle N_{\theta a}$, $\triangle N_{\theta c}$ generation in equations (15.33), and $\triangle E_{\theta a}$, $\triangle E_{\theta c}$, again into (15.34), and $E_{\theta 2}$ values.

5. With $E_{\theta 2}$ values into (15.18), 1 ~ 4 calculation procedure, until the $E_{\theta 2}$ is constant value: $E_{\theta 2}$=0.00330554, and (15.24) by the experimental spectrum wavelength λ, direct calculation values of $E_{\theta 2}$.

By the incremental $E_{\theta 2}$, we can find a hydrogen atom stimulate the process step by step changes in the rate of spin elliptical orbit centrifugal, see section 16.1 calculation example. And we also see that a single electronic stimulate step by step in the process of changes in the rate of spin elliptical orbit centrifugal is quite complicated. We are all in the future to avoid such complicated calculations, directly through the experimental determination of the atoms in each level changes, by (15.11), (15.24), directly to find out the level of the elliptical orbit centrifugal rate.

15.3 atomic outer electron spin cycle

Correlation of elliptical orbit

By (15.12), electron spin elliptical orbit the half axis $A_{\theta i}$, short axis of $B_{\theta i}$, respectively:

$$\begin{cases} A_{\theta i} = \dfrac{N_{\theta i}^2 r_0}{\overline{Z}_i K_{mi}(1-E_{\theta i}^2)} & (15.35-1) \\ B_{\theta i} = \dfrac{N_{\theta i}^2 r_0}{\overline{Z}_i K_{mi}\sqrt{1-E_{\theta i}^2}} & (15.35-2) \end{cases}$$

The area of the elliptic S for:

$$S = \frac{1}{2}\oint R_{\theta i}^2 d\theta = \pi A_{\theta i} B_{\theta i} = \pi \left(\frac{N_{\theta i}^2 r_0}{\overline{Z}_i K_{mi}} \right)^2 (1-E_{\theta i}^2)^{-1.5} \qquad (15.36)$$

Electronic along the spin elliptical orbit the cycle of $T_{\theta i}$, by (15.1-1), (15.7), to:

$$T_{\theta i} = \frac{\oint R_{\theta i} d\theta}{v_{\theta i}} = \oint \frac{2\pi m_{e0} K_{mi} R_{\theta i}^2}{N_{\theta i} h} d\theta = \frac{4\pi m_{e0} K_{mi}}{2N_{\theta i} h}\oint R_{\theta i}^2 d\theta \qquad (15.37)$$

Will type (15.36) into (15.37), to:

$$T_{\theta i} = \frac{N_{\theta i}^3 h}{(\overline{Z}_i a_c c)^2 m_{e0} K_{mi} (1-E_{\theta i}^2)^{1.5}} \qquad (15.38)$$

Some adjacent two atoms in the outermost electrons along the orbit parameters of different orbits, the distance between their relative position, space is changing and will inevitably lead to their respective rotating elliptical orbit parameter changes of Z_i, $E_{\theta i}$, $R_{\theta i}$. In order to simplify the analysis and calculation, we can only work out their respective rotating elliptical orbit, the parameters of average. And assumptions, $\overline{Z}_i$, $\overline{E}_{\theta i}$, $\overline{R}_{\theta i}$ values are the same. Due to comprehensive interaction of electric field force, similar to particle fluctuations, spin elliptical orbit, maintain the condition of moving along the orbit between them is: the spin of electrons inside the elliptical orbit cycle $\overline{Z}_i$, $\overline{E}_{\theta i}$ $N_{\theta i}$ must be outer electronic $T_{\theta 1}$ of $N_{1,2}$ times! $N_{1,2}$ for natural number or simple points.

By (15.38), to:

$$N_{1,2} = \left(\frac{N_{\theta 2}}{N_{\theta 1}}\right)^3 \left(\frac{\overline{Z}_1}{\overline{Z}_2}\right)^2 \frac{K_{m1}}{K_{m2}} \left(\frac{1-E_{\theta 1}^2}{1-E_{\theta 2}^2}\right)^{1.5} \qquad (15.39)$$

To spin elliptical orbit half axis of $A_{\theta i} = \overline{R}_{\theta i}$, by (15.12), (15.39), to:

$$\begin{cases} \dfrac{\overline{Z}_2}{\overline{Z}_1} = \left(\dfrac{N_{\theta 2}}{N_{\theta 1}}\right)^2 \dfrac{\overline{R}_{\theta 1} K_{m1}}{\overline{R}_{\theta 2} K_{m2}} \left(\dfrac{1-E_{\theta 1}^2}{1-E_{\theta 2}^2}\right) & (15.40-1) \\ \left(\dfrac{\overline{Z}_2}{\overline{Z}_1}\right)^2 = \left(\dfrac{N_{\theta 2}}{N_{\theta 1}}\right)^3 \dfrac{K_{m1}}{K_{m2} N_{1,2}} \left(\dfrac{1-E_{\theta 1}^2}{1-E_{\theta 2}^2}\right)^{1.5} & (15.40-2) \end{cases}$$

Solution (15.40) equations have to:

$$N_{1,2} = \left(\frac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}}\right)^{1.5} \sqrt{\frac{\overline{Z}_1 K_{m2}}{\overline{Z}_2 K_{m1}}} \qquad (15.41)$$

$N_{1,2}$ is the key of the boundary constraints, the adjacent layer between electron spin elliptical orbit a quantization, is behind the atomic energy level and energy spectrum provides the basis for the key.

16 hydrogen, helium and lithium atoms internal structure model, the parameters, and the spectral energy calculation

16.1 hydrogen internal structure model, the spectrum level

16.1.1 Internal structure model of the hydrogen atom

Hydrogen atoms within only one electron, electronic integrated electric charge intensity coefficient $Z_i = 1$ is not a variable. Laboratory determination of hydrogen atom ionization energy $\triangle W_{e1}$=13.599ev, electronic form in proton peripheral "s type ball shell electron cloud".

By (15.7), (15.12), "s type ball shell electron cloud" the average radius of electron spin elliptical orbit of long axis $A_{\theta i}$ for:

$$A_{\theta i} = \frac{N_{\theta i}^2 r_0}{\overline{Z}_i K_{mi}(1 - E_{\theta i}^2)} \quad (16.1)$$

To $N_{\theta 1}$=1, $\overline{Z}_1$=1, $E_{\theta 1}$=0, generation of (16.1) in type, too: $A_{\theta 1}=5.294655\times10^{-11}$m .

Electronic protons along the spin elliptical orbit around the formation of magnetic U_h, by the principle of electrodynamics, (15.1-1) and (15.7), (15.8-2), to:

$$U_h = IS = \frac{eh}{4\pi m_{e0} K_{mi}} \quad (16.2)$$

The K_{mi}... ...Equivalent generation goes into: U_h = 9.279066276 x10^{-24} j/T.

Under the action of hydrogen atom or external electric field outside the photon collision, electron spin quantum number $N_{\theta i}$= 1, 2, 3, 4... Stimulate increase gradually, electronic gradually absorb certain wavelengths of energy photon gradually inspire ionization, by (15.20), to each level of the spin elliptical orbit of eccentricity of $E_{\theta i}$ = 0, we can export was neils Bohr hydrogen atom absorption spectrum model:

$$\lambda = \frac{2h}{m_{e0} K_{mi} a_c^2 c \left(\frac{1}{N_{\theta 1}^2} - \frac{1}{N_{\theta 2}^2} \right)} \quad (16.3)$$

The $\frac{1}{\lambda} = 10967758.04 \left(\frac{1}{N_{\theta 1}^2} - \frac{1}{N_{\theta 2}^2} \right) m^{-1}$, is everyone acquaint with of Rydberg constant ".

16.1.2 Hydrogen atom spectrum energy calculation

By (16.3), to $N_{\theta i}$ = 1, 2, 3, 4... , we can find out a hydrogen atom in electronic between each level spin elliptical orbit gradually stimulated and transition when the wavelength of the absorption and emission spectrum, see table 16.1 B.

Hydrogen wavelength spectrum calculation results comparison (A °) table 16.1

$N_{\theta i}$	λ_{1-i}	λ_{2-i}	λ_{3-i}	λ_{4-i}	λ_{5-i}
2	A：1215.68 B：1215.684 C：1215.680				
3	A：1025.73 B：1025.734 C：1025.728	6562.79 6564.696 6562.760			
4	A：972.54 B：972.548 C：972.541	4861.33 4862.738 4861.374	18751.1 18756.275 18751.562		
5	A： B： C：	4340.47 4341.730 4340.486	12818.1 12821.672 12818.687	40500 40522.816 40505.555	
6	A： B： C：	4101.74 4102.935 4101.725	10938 10941.160 10938.571	26250 26258.785 26248.747	74000 74598.821 74045.421
7	A： B： C：	3970.07 3971.236 3970.034			

From the data in table 16.1 compared to: Neils Bohr atom spectrum model has high accuracy, but on the whole is greater than the determination of the wavelength. By section 15.2 of the hydrogen atoms in the electronic and orbit transfer process parameter calculation and analysis can be seen that: small errors are caused by changes in the rate of spin elliptical orbit centrifugal.

Explanation: A line is the determination of wavelength; B was Neils Bohr model calculated value, C line model to calculate the book value.

By (15.24) and the experimental determination of the hydrogen atoms in the λ_i level spectral wavelengths, we can directly get the electronic stimulate ionization step by step in the process of spin elliptical orbit eccentricity of $E_{\theta i}$ values, in table 16.2 A. With section 15.2 the last out of the hydrogen atoms in the original eccentricity of incremental $\triangle E_{\theta i}$ in the following relationship: see table 16.2 C.

Hydrogen atoms in the electron spin elliptical orbit changes in the rate of centrifugal table ($E_{\theta l}$ = 0) table 16.2

	$E_{\theta i}$

$N_{\theta i}$	$(N_{\theta i}-1)\triangle E_\theta$	$3(N_{\theta i}-1)\triangle E_\theta$	$(2N_{\theta i}-3)\triangle E_\theta$	$2N_{\theta i}-4)\triangle E_\theta$	$3N_{\theta i}\triangle E_\theta$
2	A：0.0033284765 B： C：0.0033055403				
3	A：0.0054353795 B： C：0.0066110806	0.019697843 0.019833242			
4	A：0.010820727 B： C：0.009916621	0.030218982 0.029749863	0.016345480 0.016527701		
5	A： B： C：0.013222161	0.039920633 0.039666483	0.024031726 0.023138782	0.02235718 0.019833242	
6	A： B： C：	0.049302363 0.04958310	0.031384513 0.029749863	0.02611092 0.026444322	0.061743872 0.059499725
7	A： B： C：	0.058649886 0.059499725			

By the C line as shown in the table 16.2 $E_{\theta i}$ a revised, and the type (15.20), and a hydrogen atom in electronic stimulate step by step in the process of absorption wavelength, see table 16.1 C, its precision is higher than neils Bohr atom spectrum model.

In fact, like nuclear internal parameter calculation, the hydrogen atom electronic magnetic energy continues to exist. So in the electronic energy level transition should be considered in the process of the change of magnetic energy. For interested readers simulated calculation.

16.2 Helium atoms in internal structure model

The spectrum level

16.2.1 Helium atoms in internal structure model

According to the results of laboratory detection of helium atoms, there are two helium atoms in electronics, forming a layer "s type ball shell electron cloud". The primary and secondary ionization energy are only one, $\triangle W_{e1}$ = 24.587ev, $\triangle W_{e2}$ = 54.416ev. Electronic in each level track stimulated or transition in the process of absorption and emission spectra of wavelength in table 16.3 to 6, (3) (the same below).

Through comparative analysis, helium atoms in the spatial distribution of two electron spin elliptical orbit must be shown in figure 16.1. To maintain two electrons between the nucleus and comprehensive electric field force, centrifugal force balance, they must each take a level, and the parameters are the same and nuclear symmetry in the center of the spin, lateral rotation ellipsoid surface of orbit. While two paired electrons into the quality coefficient K_m=1. By coulomb's law, every electron in another electronic and atomic nucleus under the action of electric field force, the average charge intensity coefficient $\overline{Z}_i$ is:

$$\frac{\overline{Z}_i e^2}{4\pi\varepsilon_0 \overline{R}_{\theta i}^2} = \frac{2e^2}{4\pi\varepsilon_0 \overline{R}_{\theta i}^2} - \frac{e^2}{4\pi\varepsilon_0 (2\overline{R}_{\theta i})^2} \quad (16.4)$$

Solution (16.4), to: $\overline{Z}_i$ = 1.75. When an electron completely, remaining another electronic, $\overline{Z}_i$ = 2.

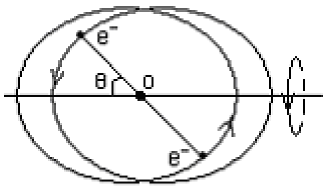


Figure 16.1 helium atoms in paired electron spin orbit constitution diagram

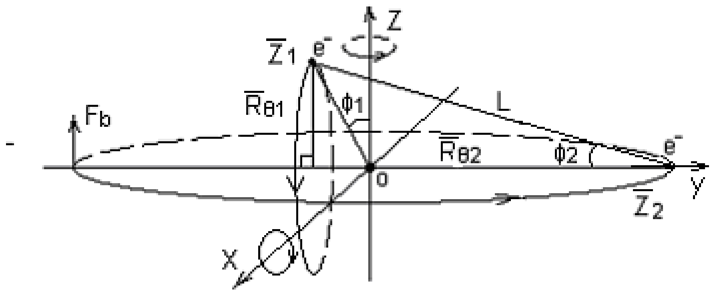


Figure 16.2 helium atom excitation process electron spin orbit constitution diagram

When helium atoms in the first electronic gradually ionization, because another electronic and atomic nucleus the interaction of electric field force and two electron spin elliptical orbit must be shown in 16.2 the spatial distribution of orbit to maintain balance. (Spatial distribution of the electron, shown in figure 16.2 is based on the determination of atomic outer "probability" a "s, p, d, f" type of the specific shape to speculate, same as follows.) Z_1 electron spin momentum vector pointing in the direction of the Y axis, the Z_2 electronics, nucleus under the action of electric field force, spin elliptical orbit plane attach around the Z axis rotation. Similarly, Z_2 electronic in Z_1, nuclear electric power, electron spin elliptical orbit form under the magnetic force, attach of lateral movement and the XOY orbital plane, swinging. Combination to make Z_1, Z_2 electron spin elliptical orbit plane in vertical condition each other and rotates on the X axis additional together. Superposition movement result is two layer "s type ball shell electron cloud". By (15.41), two layers of electron spin elliptical orbit cycle $T_{\theta 1}$, $T_{\theta 2}$ should also exist between multiple $N_{1,2}$ the relationship between.

When helium atoms in the first electronic gradually ionization, because another electron and the nucleus of the electric field force based on the analysis of the above, if we consider the original wave motion; Inner and outer two electrons along their respective elliptical orbit to different position, the spin track radius change, each other space position change; Due to their comprehensive electric charge strength coefficient of Z_1, Z_2 complex changes and the periodicity of elliptical orbit deformation. The reader imagine not hard, electronic movement track, complex to what extent! So, we can only seize the main electronic along the motion law of elliptical orbit, the spin elliptical orbit cycle $T_{\theta 1}$, $T_{\theta 2}$ between multiple $N_{1,2}$ relationship, with average parameters $\overline{Z}_i$, $\overline{R}_{\theta i}$, $E_{\theta i}$, simplify the value simulation analysis and calculation. Back to all of the illustrations in chapter 18, for drawing convenient, intuitive, on the chart we paired electrons to $R_{\theta i(\pi)}$ value for $\overline{R}_{\theta i}$ value, please pay attention to identify readers.

By (15.7), (15.12), electron spin elliptical orbit the average radius of $\overline{R}_{\theta i}$ and average charge strength coefficient of $\overline{Z}_i$, relationship is:

$$\overline{R}_{\theta i} = \frac{N_{\theta i}^2 r_0}{\overline{Z}_i K_{mi}(1 - E_{\theta i}^2)} \tag{16.5}$$

According to Newton's mechanics, coulomb's law, as shown in figure 16.2, two electrons between the nucleus and the balance of the electric field force interaction relationship, we have:

$$\begin{cases} L = \sqrt{\overline{R}_{\theta 1}^2 + (\overline{R}_{\theta 2} + \overline{R}_{\theta 1} tg\phi_1)^2} & (16.6-1) \\ \dfrac{\overline{Z}_1 e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} = \dfrac{2e^2 \cos^3\phi_1}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} - \dfrac{e^2 \sin\phi_2}{4\pi\varepsilon_0 L^2} & (16.6-2) \\ \dfrac{\overline{Z}_2 e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} = \dfrac{2e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} - \dfrac{e^2 \cos\phi_2}{4\pi\varepsilon_0 L^2} & (16.6-3) \\ \dfrac{2e^2 \cos^2\phi_1}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} \sin\phi_1 = \dfrac{2e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} & (16.6-4) \end{cases}$$

Of simplifying the equations (16.6):

$$\begin{cases} \overline{Z}_1 = 2\cos^3\phi_1 - \left[1+\left(\dfrac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}} + tg\phi_1\right)^2\right]^{-1.5} & (16.7-1) \\ \overline{Z}_2 = 2 - \left(1+\dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}tg\phi_1\right)\left[\left(\dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}\right)^2 + \left(1+\dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}tg\phi_1\right)^2\right]^{-1.5} & (16.7-2) \\ \dfrac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}} = \dfrac{1}{\cos\phi_1\sqrt{\sin\phi_1}} & (16.7-3) \end{cases}$$

Will type (15.41) and (16.7) into the equations:

$$\frac{1}{(\sin\phi_1)^{1.5} N_{1,2}^2} = \frac{2\left[1+\sin\phi_1 + 2(\sin\phi_1)^{1.5}\right]^{1.5} - \left[1+(\sin\phi_1)^{1.5}\right]}{2\left[1+\sin\phi_1 + 2(\sin\phi_1)^{1.5}\right]^{1.5} - (\sin\phi_1)^{1.5}} \quad (16.8)$$

By (16.5), the adjacent two electrons spin elliptical orbit average radius ratio of $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$ for:

$$\frac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}} = \left(\frac{N_{\theta 2}}{N_{\theta 1}}\right)^2 \frac{\overline{Z}_1 K_{m1}}{\overline{Z}_2 K_{m2}} \left(\frac{1-E_{\theta 1}^2}{1-E_{\theta 2}^2}\right) \quad (16.9)$$

Combined with equations (16.7), we can estimate (16.8) - the $N_{1,2}$ value scope, to prepare for the subsequent simulation. Similarly, by (16.9), but also can be used to deduce $E_{\theta 2}$ and $N_{\theta 2}$ would equation parameters such as:

$$E_{\theta 2} = \sqrt{1-\left(\frac{N_{\theta 2}}{N_{\theta 1}}\right)^2 \frac{\overline{Z}_1 K_{m1}}{\overline{Z}_2 K_{m2}} \frac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}} (1-E_{\theta 1}^2)} \quad (16.10)$$

By the law of conservation of energy, (15.11), (15.25-2), (16.3), an electron spin quantum number from $N_{\theta a} \rightarrow N_{\theta c}$ would inspire change process, absorb the energy of the photon ΔW_γ should be equal to the two each electronic total ionization energy in the atomic energy level of the poor:

$$\Delta W_\gamma = \sum \Delta W_{eia} - \sum \Delta W_{eic} \quad (16.11)$$

Absorb the wavelength of the photon $\lambda_{a\text{-}c}$ for:

$$\lambda_{a-c} = \frac{hc}{e\left(\sum \Delta W_{eia} - \sum \Delta W_{eic}\right)} \quad (16.12)$$

16.2.2 Helium atom spectrum energy calculation

To sum up, the helium atoms in electron spin elliptical orbit parameters and absorption wavelength calculation procedure is as follows:

1 Determined by the laboratory of helium atoms in the first and second sum of ionization energy, as the original total ionization energy: $\sum \Delta W_{e0}$ = 79.003ev. Make K_{m1} = 1, $\overline{Z}_1$ = 1.75, $N_{\theta 1}$ = 1, see figure 16.1, the generation of (15.11) in type, calculate electron spin elliptical orbit of original centrifugal rate: $E_{\theta 0}$= 0.227995205.

2. Will the above parameters in (15.7) and (15.12), to θ=0, π, have "s type ball shell electron cloud" the inner and outer radius of $R_{\theta 1(0)}$, $R_{\theta 1(\pi)}$, average radius $\overline{R}_{\theta 1}$ and the thickness of the $\triangle R_{\theta 1}=R_{\theta 1(\pi)}-R_{\theta 1(0)}$ is respectively:

$R_{\theta 1(0)}$=0.2462A° $R_{\theta 1(\pi)}$=0.3917A° $\overline{R}_{\theta 1}$=0.3190A° $\triangle R_{\theta 1}$=0.1455A°

(the data significantly less than the value $R_{\theta 1(\pi)}$=1~ 1.1 A°, its reason is that most of the atomic radius is compound or mass calculation of the proportion of liquid or solid, atoms between outer electron spin elliptical orbit or "probability" has different degree of overlap, helium atoms are inert gases, not combined with other atoms, and is in cryogenic liquid state, "s type ball shell electron cloud" the edge of the display with the number of the negative electric field can also prevent between helium atoms in near further, to the experimental value bigger).

3. When an electron from the start to completely ionization, the average charge intensity coefficient for inner electronic $\overline{Z}_1$=1.75→2. Make K_{m1} = 0.9998629254, $N_{\theta 1}$=1, $\overline{Z}_1$=2, $E_{\theta 1}$=0, generation into (15.11), is the inner electronic ionization energy for: $\triangle W_{e1}$ = 54.41533133 ev, still less than the value of 54.416 ev. So, in helium atoms in outer electronic ionization process step by step, the inner electron spin elliptical orbit changes in the rate of the centrifugal by $E_{\theta 0}$→0.

(4) From (16.9), (15.41), to $E_{\theta 1}=E_{\theta 2}=0$, $N_{\theta 1}$=1, $N_{\theta 2}$=2, $\overline{Z}_1$=1.95, $\overline{Z}_2$ =1, generation to estimate are: $N_{1,2}$ = 30.42, by the same token, if to $\overline{Z}_1$=2, $\overline{Z}_2$ =1, the $N_{1,2}$ = 32.

5. Take the $N_{1,2}$ = 31, generation of (16.8) in type, too: Φ_1= 0.916733834°, the value generation to equations (16.7) are: $\overline{Z}_1$ = 1.997268498, $\overline{Z}_2$ = 1.027369561.

6. Will $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$, $\overline{Z}_i$, $N_{\theta i}$ equivalent generation into (16.10), calculate $E_{\theta 2}$ = 0.1285330284.

7. Will, NAA would, $\overline{Z}_i$, $N_{\theta i}$, E_θ equivalent generation into (15.11), calculates the helium atoms excited states of the atomic energy level always ionization energy:

$\sum \Delta W_{eic}$ =57.79716452ev

8. Make $\sum \Delta W_{eia}$ =79.003ev, will $\sum \Delta W_{eic}$ = 57.79716452ev together into (16.12), to: λ_{a-c} = 584.670A°, 584.3A° comparison with experimental data, A little big.

9. Adjust the scope of the $E_{\theta 1}$ repeat 6 ~ 8 calculation procedure, finally: when the $E_{\theta 1}$= 0.01525,

$E_{\theta 2}$=0.129419704 $\sum \Delta W_{eic}$ =57.78372307ev λ_{a-c}=584.300A°

10. Similarly, to $N_{\theta 2}$= 1.5, 2.5, 3, 4, 5, 6, N1, 2 = 11, 62, 108, 256, 500 and 864, respectively, repeat 4 ~ 9 calculation procedure, we can find out the helium atoms all far ultraviolet spectral wavelengths, shown in table 16.3.

Helium atoms far ultraviolet wavelength spectrum calculation results table (A°) 16.3

$N_{\theta 1}$	$N_{\theta 2}$	$N_{1,2}$	$E_{\theta 1}$	$E_{\theta 2}$	$\sum \Delta W_{eic}$ ev	calculated λa -- cA°	Experimental λ_{a--c}A°
	1.5	11	0.198890	0.2350068249	58.03846134	591.400	591.4
1	2	31	0.01525	0.129419704	57.78372307	584.300	584.3
	2.5	62	0.101903	0.1390334447	55.99608629	538.900	538.9
	3	108	0.0105	0.08235517544	55.91469054	537.000	537.0
1	4	256	0.0088	0.04610406155	55.26032413	522.200	522.2
	5	500	0.0072	0.02962118787	54.95639484	515.600	515.6
	6	864	0.005	0.02048134594	54.79176748	512.094	

Note: due to limited experimental data collected $N_{\theta 2}$ > 6 of calculation (same below).

Helium atoms in part of the visible spectrum wavelength the results table (A°) 16.4

$N_{\theta 1}$	$N_{\theta 2}$	$N_{1,2}$	$E_{\theta 1}$	$E_{\theta 2}$	$\sum \Delta W_{eic}$ ev	calculated λa -- cA°	Experimental λ_{a--c}A°
	1.5	11	0.19889	0.2350068249	58.03846134		
1	3	107	0.0057	0.02474674815	55.92832058	5875.639	5875.6
	4	256	0	0.04525818282	55.26460382	4469.741	4471.6
	5	500	0	0.02873356175	54.95924392	4026.486	4026.2
	2	31	0.01525	0. 129419704	57.78372307		
1	3	107	0.00732	0.02516906259	55.92714088	6678.091	6678.1
	4	256	0	0.04525818282	55.26460382	4921.730	4921.9
	5	500	0	0.02873356175	54.95924392	4389.632	

11. The table 16.3, respectively to: $N_{\theta 2a}$ = 1.5, 2, $\sum \Delta W_{eia}$ =58.03846134 ev, 57.78372307 ev, $N_{\theta 2}$ = 3, 4, and 5, respectively, repeat 4 ~ 9 calculation procedures, can be a part of the visible spectrum, shown in table 16.4.

Helium atoms in a couple of far infrared wavelength spectrum calculation results table (A°) in table 16.5

$N_{\theta 1}$	$N_{\theta 2}$	$N_{1,2}$	$E_{\theta 1}$	$E_{\theta 2}$	$\sum \Delta W_{eic}$ ev	calculated λa -- cA°	Experimental λ_{a--c}A°

	2.5	62	0.101903	0.1390334447	55.99608629		
	3	107	0.00448	0.02449467588	55.92901521	184854.99	184859.06
1	3	107	0.01078	0.02638316495	55.92363819	171135.27	171129.148
	3	107	0.01149	0.02668096556	55.92275384	169071.47	169082.189
	3	107	0.01241	0.02708965064	55.92152405	166282.89	166271.70
	3	107	0.01441	0.02806168321	55.91852396	159851.11	159850.318

Helium atoms in surplus visible spectroscopy and infrared wavelength calculation results table (A°) 16.6

$N_{\theta 1}$	$N_{\theta 2}$	$N_{1,2}$	$E_{\theta 1}$	$E_{\theta 2}$	$\sum \Delta W_{eic}$ ev	calculated λa -- cA°	Experimental $\lambda_{a\text{ -- }c}$A°
	2	31	0.01525	0.129419704	57.78372303		
	2	42	0.0205	0.4319577419	57.18142959	20585.354	20582.0
	2	59	0.0168	0.587643035	56.6389549	10830.511	10830.3
1	2	92	0.0119	0.713861862	56.08096694	7281.386	7281.3
	2	97	0.0067	0.725447722	56.02899709	7065.733	7065.7
	3	229	0.0066	0.6289540292	55.32752142	5047.804	5047.7
	4	316	0.0024	0.363745375	55.15327507	4713.427	4713.4
	7	1694	0	0.3622944219	54.65653834	3964.724	3964.7
	8	2628	0	0.3914481215	54.59532809	3888.610	3888.6

12. The table 16.3, the $N_{\theta 2a}$=2.5, $N_{\theta 2}$=3, $N_{1,2}$=107, $\sum \Delta W_{eia}$ =55.99608629ev, repeat 5 ~ 9 calculation procedures, can get the helium atoms in a few far infrared spectral wavelengths, shown in table 16.5.

13. The table 16.4, the $N_{\theta 2a}$=2, $\sum \Delta W_{eia}$ = 57.78372307 ev, $N_{\theta 2}$= 2, 3, 4, 7, 8, $N_{1,2}$=42, 59, 92, 97, 229, 316, 1694, 2628, respectively, repeat 4 ~ 9 calculation procedures, can get the helium atoms surplus visible spectroscopy and infrared wavelength, shown in table 16.6.

16.3 lithium atoms internal structure model

The spectrum level

16.3.1 Lithium atoms internal structure model

By experimental detection: lithium atoms by two layer "s type ball shell electron cloud". A total of three electronics, level 3 ionization energy, respectively, 5.392, 75.638 and 122.451 ev. Atomic radius of 1.5 ~ 1.6 A°, atomic absorption and emission spectra of the two-level wave table 16.8 ~ 16.11.

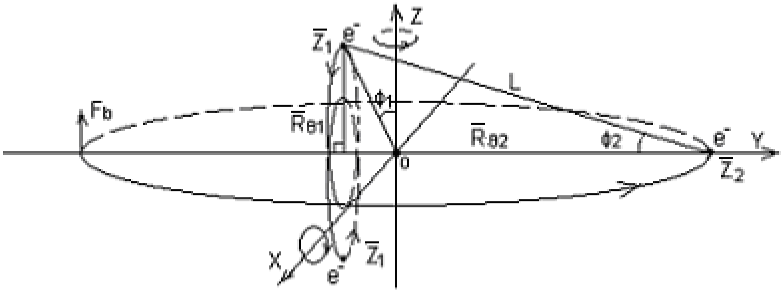


Figure 16.3 of lithium atom in electron spin combination with elliptical orbit

According to figure 16.2 helium atoms ionization step by step in the process of electron spin elliptical orbit combination model of lithium atom in three electronic should be in 16.3 the spin of the elliptical orbit combination model can be in a state of stable movement. Similarly, various electric and magnetic field between the electronic interactions will lead to additional rotation and lateral movement, comprehensive superposition result is rotating ellipsoid surface combination of two layer "s type ball shell electron cloud".

According to Newton's mechanics and Coulomb's law, we have:

$$\begin{cases} L = \sqrt{\overline{R}_{\theta 1}^2 + (\overline{R}_{\theta 2} + \overline{R}_{\theta 1} tg\phi_1)^2} & (16.13-1) \\ \dfrac{\overline{Z}_1 e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} = \dfrac{3e^2\cos^3\phi_1}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} - \dfrac{e^2}{4\pi\varepsilon_0 (2\overline{R}_{\theta 1})^2} - \dfrac{e^2 \sin\phi_2}{4\pi\varepsilon_0 L^2} & (16.13-2) \\ \dfrac{\overline{Z}_2 e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} = \dfrac{3e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} - \dfrac{2e^2\cos\phi_2}{4\pi\varepsilon_0 L^2} & (16.13-3) \\ \dfrac{2\times 3e^2\cos^2\phi_1}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2}\sin\phi_1 = \dfrac{3e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} & (16.13-4) \end{cases}$$

Simplified as:

$$\begin{cases} \overline{Z}_1 = 3\cos^3\phi_1 - \dfrac{1}{4} - \left[1 + \left(\dfrac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}} + tg\phi_1\right)^2\right]^{-1.5} & (16.14-1) \\ \overline{Z}_2 = 3 - 2\left(1 + \dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}} tg\phi_1\right)\left[\left(\dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}\right)^2 + \left(1 + \dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}} tg\phi_1\right)^2\right]^{-1.5} & (16.14-2) \\ \dfrac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}} = \dfrac{1}{\cos\phi_1\sqrt{2\sin\phi_1}} & (16.14-3) \end{cases}$$

Will type (15.41) and (16.14) into the equations, because of $K_{m1} = 1$, so:

$$\frac{K_{m2}}{(2\sin\phi_1)^{1.5}N_{1,2}^2}=\frac{3\left[1+2\sin\phi_1+(2\sin\phi_1)^{1.5}\right]^{1.5}-\left[2+(2\sin\phi_1)^{1.5}\right]}{\left(3-\dfrac{1}{4\cos^3\phi_1}\right)\left[1+2\sin\phi_1+(2\sin\phi_1)^{1.5}\right]^{1.5}-(2\sin\phi_1)^{1.5}} \quad (16.15)$$

By (16.9), (15.41), inside and outside two layers adjacent electron spin elliptical orbit cycle multiple $N_{1,2}$ the relationship between is:

$$N_{1,2}=\left(\frac{N_{\theta 2}}{N_{\theta 1}}\right)^3\left(\frac{\overline{Z}_1}{\overline{Z}_2}\right)^2\frac{K_{m1}}{K_{m2}}\left(\frac{1-E_{\theta 1}^2}{1-E_{\theta 2}^2}\right)^{1.5} \quad (16.16)$$

16.3.2 Lithium atom spectrum energy calculation

To sum up, with reference to the helium atoms in electron spin elliptical orbit parameters and spectrum energy wave calculation method of lithium atom in the spectrum level wavelength calculation procedure is as follows:

1. When lithium atoms outer electrons completely, the inner two electron spin elliptical orbit combination with helium atoms. By (16.4): $\overline{Z}_1 = 2.75$.

2. By the second and third electronic ionization energy sum $\sum \Delta W_e$ = 198.089 ev, to $N_{\theta 1}$= 1, K_{m1} = 1, $\overline{Z}_1$=2.75, and into the (15.11), to: $E_{\theta 1}$ = 0.1934005519.

3. The outer electronic ionization process, step by step to the inner of electron spin elliptical orbit parameters influence is small; we can put them as the basis for proper adjustment.

4. Make $N_{\theta 1}$= 1, $N_{\theta 2}$= 1.5, $E_{\theta 1}$= 0.1934005519, $E_{\theta 2}$=0, $\overline{Z}_1$=2.75, $\overline{Z}_2$=1, K_{m1}=1, K_{m2}=0.9999218102, generation of (16.16) in type, too: $N_{1,2}$= 24.1068.

5. Take the $N_{1,2}$ = 24, generation of (16.15) in type, too: Φ_1 = 0.768043708°. Will Φ_1 value generation to equations (16.14) is: $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$ =6.107997833. $\overline{Z}_1$=2.745000742, $\overline{Z}_2$ =1.085882032.

6. Will $N_{\theta i}$, $E_{\theta 1}$, $\overline{Z}_i$, K_{mi} equivalent generation into (16.10), to: $E_{\theta 2}$ = 0.321806274.

7. Will $N_{\theta i}$, $E_{\theta i}$, $\overline{Z}_i$ and K_{mi} parameters respectively into (15.11) is the total ionization energy: $\sum \Delta W_{eia}$ = 203.7607675 ev, compared with the experimental value $\sum \Delta W_{eia}$ = 203.481 ev, slightly bigger.

8. The fine-tuning $E_{\theta 1}$ scope, repeat 6 ~ 7 calculation procedure, finally: when $E_{\theta 1}$=0.1967877968, $E_{\theta 2}$= 0.3237130035, $\sum \Delta W_{eia}$ =203.481 ev.

9. By (15.7), (15.12), respectively to θ=0, π, lithium atoms in electron spin elliptical orbit inside and outside

radius and average radius, respectively:

$R_{\theta 1(0)}$=0.1611A° $R_{\theta 1(\pi)}$=0.2400A° $\overline{R}_{\theta 1}$ =0.2005A°

$R_{\theta 2(0)}$=0.8284A° $R_{\theta 2(\pi)}$=1.6215A° $\overline{R}_{\theta 2}$ =1.2249A°

Of course, if we change $N_{1,2}$ the scope of, also can find the corresponding spin elliptical orbit parameters, but atomic radius with the experimental value difference is bigger, shown in table 16.7.

Lithium atoms in electron spin elliptical orbit parameters calculation results table (R_θ units: A°) table 16.7

$N_{1,2}$	20	22	23	24	27
$E_{\theta 1}$	0.2039826921	0.200206942	0.198456041	0.1967877968	0.1922230755
$E_{\theta 2}$	0.1416428756	0.2542468475	0.2919388194	0.3237130035	0.3975299812
$\overline{Z}_1$	2.742886747	2.744081026	2.7445696	2.745000742	2.746028199
$\overline{Z}_2$	1.108166703	1.09592591	1.090665912	1.085882032	1.073844193
$R_{\theta 2(0)}$	0.9412	0.8663	0.8451	0.8284	0.7934
$R_{\theta 2(\pi)}$	1.2518	1.4569	1.5419	1.6215	1.8405
$\overline{R}_{\theta 2}$	1.0965	1.1616	1.1935	1.2249	1.3170
Note	The experiment $R_{\theta 2(\pi)}$= 1.5-1.6 A°. So, $N_{1,2}$ = 23,24 the two groups data can be used				

10. The $N_{\theta 2}$=2, $\overline{Z}_1/\overline{Z}_2$ =2.75, $E_{\theta 2}$=0, $E_{\theta 1}$=0.1935, the generation of (16.16) in type, too: $N_{1,2}$=57.134, take $N_{1,2}$=57, repeat 5~7 applications: $\sum \Delta W_{eic}$ = 201.4193956 ev.

Lithium atoms line of spectrum calculation results table (A°) 16.8

$N_{\theta 1}$	$N_{\theta 2}$	$N_{1,2}$	$E_{\theta 1}$	$E_{\theta 2}$	$\sum \Delta W_{eic}$ ev	calculated λa -- cA°	Experimental λ_{a--c}A°
	1.5	23	0.198456041	0.2919388194	203.481		
	2	57	0.190848437	0.1832293863	201.6326517	6707.840	6707.84
	3	193	0.19276	0.0861962094	199.6454801	3232.528	3232.61
1	4	457	0.19315	6	198.958488	2741.491	2741.31
	5	892	0.19328	0.0443257406	198.6428922	2562.660	2562.50
	6	1543	0.19333	3	198.4724202	2475.437	2475.30
	7	2450	0.19340	0.0156613831	198.3666534	2424.244	
	8	3657	0.19340	6	198.3016049	2393.798	
				0.0220635465			
				4			
				0.0157680686			
				6			
				0.01111312169			

11. To $\sum \Delta W_{eia}$ = 203.481 ev, with $\sum \Delta W_{eic}$ = 201.4193956 ev into (16.12), to: λ_{a-c} = 6013.969 A°.

12. Fine-tuning $E_{\theta 1}$ scope, repeat 6 ~ 7, 11 calculation procedure, finally have to:

$E_{\theta 1}$=0.190848437 $E_{\theta 2}$=0.1832293863

$\sum \Delta W_{eic}$ =201.6326517ev λ_{a-c}=6707.840A°

13. Make $N_{\theta 2}$= 2, 3, 4, 5, 6, 7, 8, $\bar{Z}_1/\bar{Z}_2$ =2.75, $E_{\theta 2}$ = 0, $E_{\theta 1}$=0.1935, respectively into (16.16), to: $N_{1,2}$ = 57, 193, 457, 892, 1543, 2450, 3657.

Lithium atoms "crazy" - line spectrum calculation results table (A°) 16.9

$N_{\theta 1}$	$N_{\theta 2}$	$N_{1,2}$	$E_{\theta 1}$	$E_{\theta 2}$	$\sum \Delta W_{eic}$ ev	calculated λa -- cA°	Experimental λ_{a--c}A°
1	2	57	0.190848	0.1832293863	201.6326517		
	3	193	0.19331	0.08745673627	199.6014517	6103.990	6103.53
	4	457	0.19339	0.04539764991	198.9393154	4603.370	4603.0
	5	892	0.19341	0.01724780055	198.6325189	4132.625	4132.3
1	6	1543	0.19341	0.02277992403	198.4660412	3915.361	3915.0
1	7	2450	0.19342	0.01602083031	198.3650591	3794.361	3794.7
	8	3657	0.19343	0.01164284397	198.2992142	3719.411	

14. In different $N_{1,2}$ value, respectively into (16.15), repeat 5~7, 11~12 calculation procedures, can be derived lithium atoms all lines of spectrum, it is equivalent to the hydrogen atom line is "crazy", shown in table 16.8.

15. Similarly, to $N_{\theta 2}$=3, 4, 5, 6, 7, 8, from the table, 16.8, $\sum \Delta W_{eia}$ =201.6326517 ev, with $N_{\theta 2}$ value corresponding to the $N_{1,2}$ value, respectively into (16.15), repeat the 14 calculation procedures, can calculate lithium atoms "overflow line is" full spectrum, equivalent to the hydrogen atom "Baal line is not", shown in table 16.9.

16. By table 16.8, make $\sum \Delta W_{eia}$ = 199.6454801 ev, $N_{\theta 2}$= 4, 5, $N_{1,2}$ = 457, 892, respectively, and the type (16.15), repeat the 14 calculation procedures, can calculate lithium atoms baseline of spectrum, equivalent to the hydrogen atom line is "Xing", shown in table 16.10.

17. Make $N_{\theta 2}$ = 2.5, 3.5, 4.5, 5.5, 6.5, 7.5, $\bar{Z}_1/\bar{Z}_2$ =2.75, $E_{\theta 2}$ = 0, $E_{\theta 1}$= 0.1935, respectively into (16.16), to: $N_{1,2}$ = 112, 306, 651, 1188, 1961, 3013.

18. Make $\sum \Delta W_{eia}$ = 201.6326517 ev, $N_{1,2}$ = 112 equivalent generation into the type (16.15) respectively, repetition 14 calculation procedures, can be derived lithium atoms "sharp line is" full spectrum, shown in table 16.11.

Lithium atoms baseline of wavelength spectrum calculation results table (A°) 6.10

$N_{\theta 1}$	$N_{\theta 2}$	$N_{1,2}$	$E_{\theta 1}$	$E_{\theta 2}$	$\sum \Delta W_{eic}$ ev	calculated λa -- cA°	Experimental λ_{a--c}A°

	3	193	0.19276	0.08619620946	199.6454801		
1	4	457	0.19285	0.04295020444	198.9824202	18698.801	18697.0
	5	892	0.19287	0.0089918741	198.675562	12782.961	12782.2
	6	1543	0.19289	0.0176167807	198.5074576	10894.709	

Line is lithium atoms "sharp" wavelength spectrum calculation results table (A°) 6.11

$N_{\theta 1}$	$N_{\theta 2}$	$N_{1,2}$	$E_{\theta 1}$	$E_{\theta 2}$	$\sum \Delta W_{eic}$ ev	calculated λa -- cA°	Experimental $\lambda_{a\,--\,c}$A°
	2	57	0.190848437	0.1832293863	201.6326517		
	2.5	112	0.19509	0.1335764277	200.1068834	8126.020	8126.52
1	3.5	306	0.19414	0.0603233854	199.138651	4971.299	4971.90
	4.5	651	0.19376	0.0408945626	198.7315359	4273.674	4273.3
	5.5	1188	0.19361	0.0224304931	198.5219727	3985.761	3985.8
	6.5	1961	0.1935	0.01285992717	198.4030833	3839.035	

Through this chapter to three kinds of hydrogen, helium and lithium atoms wavelength spectrum simulation, can see: the inner electron spin elliptical orbit of centrifugal rate scope, $0 \leq E_{\theta 1} \leq 1$ can be used as the boundary constraints consideration; $E_{\theta 1}$ value from the atoms of the original state transition to electronic completely after ionization ion condition; As long as further fine-tuning $E_{\theta 1}$ value, can make the wavelength spectrum calculation value and experimental value equal, but have no the necessary.

Atomic spectrum or level is based on atomic energy group as a whole. When an electron in the ionization process, step by step it and economical, lining surplus electronic integrated the average electric charge the strength coefficient of $\overline{Z}_i$ and the rail, and energy parameters will be gradually changed. And conditions within the nucleus of the γ ray forming principle, is under the condition of total energy conservation, repeated simulation of the whole system accumulate.

17 Beryllium, boron and carbon atoms internal structure, parameters and the atomic energy level

17.1 beryllium atomic internal structure, parameters and the atomic energy level

17.1.1 Beryllium atomic internal structure and parameter calculation

Beryllium atoms there were four electronics, composition inside and outside two layer "s type ball shell electron cloud". Experimental determination of four electronic ionization energy, respectively, 9.322, 18.211, 153.893, 217.713 ev, the atom radius of 1.0-1.1 A°.

Beryllium atomic outer first electronic ionization front, inner and outer electron spin elliptical orbit combination are helium atoms. After the first electronic completely ionization of beryllium ion B + electron spin elliptical orbit combination of lithium atoms, so relevant parameters calculation should be 3 steps.

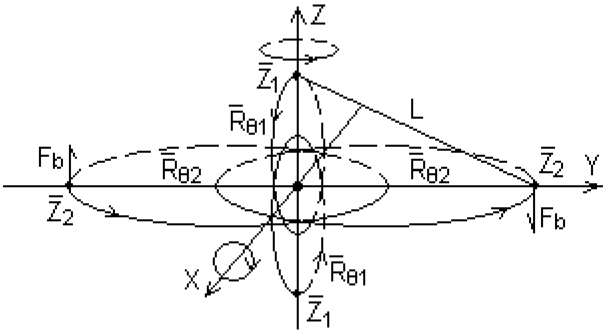


Figure 17.1 beryllium atoms in the electron spin, lateral additional movement track combination model

According to figure 16.2, beryllium atoms within four electron spin elliptical orbit combination shall be as shown in figure 17.1, to maintain stability. Inner electron spin elliptical orbit plane in outer electronic electric and magnetic field strength under the action of spin elliptical orbit will be additional rotation axis, form two symmetrical rotating ellipsoid surface and outer electronic, electronic electric and magnetic field strength under the action of spin elliptical orbit will appear lateral additional movement. The mutual influence the forms inside and outside two layer "s type ball shell electron cloud". According to Newton's mechanics, coulomb's law, we have:

$$\begin{cases} L = \sqrt{\overline{R}_{\theta 1}^2 + \overline{R}_{\theta 2}^2} & (17.1-1) \\ \dfrac{\overline{Z}_1 e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} = \dfrac{4e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} - \dfrac{e^2}{4\pi\varepsilon_0 (2\overline{R}_{\theta 1})^2} - \dfrac{2e^2 \overline{R}_{\theta 1}}{4\pi\varepsilon_0 L^3} & (17.1-2) \\ \dfrac{\overline{Z}_2 e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} = \dfrac{4e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} - \dfrac{e^2}{4\pi\varepsilon_0 (2\overline{R}_{\theta 2})^2} - \dfrac{2e^2 \overline{R}_{\theta 2}}{4\pi\varepsilon_0 L^3} & (17.1-3) \end{cases}$$

Simplified to:

$$\begin{cases} \overline{Z}_1 = 3.75 - 2\left[1+\left(\dfrac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}}\right)^2\right]^{-1.5} & (17.2-1) \\ \overline{Z}_2 = 3.75 - 2\left[1+\left(\dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}\right)^2\right]^{-1.5} & (17.2-2) \end{cases}$$

By (15.41), (16.16), because K_m=1, to:

$$\begin{cases} \dfrac{\overline{Z}_2}{\overline{Z}_1} = \dfrac{1}{N_{1,2}^2}\left(\dfrac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}}\right)^3 & (17.3-1) \\ N_{1,2} = \left(\dfrac{N_{\theta 2}}{N_{\theta 1}}\right)^3\left(\dfrac{\overline{Z}_1}{\overline{Z}_2}\right)^2\left(\dfrac{1-E_{\theta 1}^2}{1-E_{\theta 2}^2}\right)^{1.5} & (17.3-2) \end{cases}$$

Simultaneous equations (17.2), (17.3) to:

$$\frac{1}{N_{1,2}^2}\left(\frac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}}\right)^3 = \frac{3.75-2\left[1+\left(\overline{R}_{\theta 1}/\overline{R}_{\theta 2}\right)^2\right]^{-1.5}}{3.75-2\left[1+\left(\overline{R}_{\theta 2}/\overline{R}_{\theta 1}\right)^2\right]^{-1.5}} \qquad (17.4)$$

By (15.11), inside and outside two layers of electron spin elliptical orbit of eccentricity $E_{\theta i}$ for:

$$E_{\theta i} = \sqrt{1-\frac{\Delta W_{ei} e N_{\theta i}^2}{(\overline{Z}_i a_c c)^2 m_{e0}}} \qquad (17.5)$$

Beryllium atoms in electron spin elliptical orbit parameters simulation program are as follows:

1. By beryllium atoms inside and outside two layer of ionization energy, make $\sum \Delta W_{e2}$ =27.533 ev, $\sum \Delta W_{e1}$ =371.606 ev, $N_{\theta 1}$=1, $N_{\theta 2}$=1.5. Type, by (16.4) $\overline{Z}_1$= 3.75, $\overline{Z}_2$ =1.75, respectively into (17.5), to: $E_{\theta 1}$=0.1699644106, $E_{\theta 2}$=0.5065796762.

2. Will the above parameters into (17.3-2), to: $N_{1,2}$ = 23.139, take 23.

3. The $N_{1,2}$ = 23 into (17.4), to: $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$ = 6.3621652, generation to equations (17.2) are: $\overline{Z}_1$= 3.742512847, $\overline{Z}_2$ = 1.821891263.

4. Make $E_{\theta 1}$= 0.1699644106, will the $N_{\theta i}$, $\overline{Z}_i$, $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$, together into (16.10), to: $E_{\theta 2}$= 0.5426923566.

5. Will $N_{\theta i}$, $\overline{Z}_i$, $E_{\theta i}$ value generation into (15.11), respectively, for beryllium atomic original state of ionization energy: $\sum \Delta W_{eia}$ = 398.4441085 ev, compared with the experimental value $\sum \Delta W_{ei0}$ = 399.139 ev, is a little small.

6. Fine-tuning $E_{\theta 1}$ value, repeat 4 ~ 5 applications, finally to: when the $E_{\theta 1}$= 0.16490685, $E_{\theta 2}$=0.5415575863, $\sum \Delta W_{eia}$ =399.139ev.

7. Make θ_i=0, π, the above parameters respectively into (15.7), (15.12), is beryllium atomic outer "s type electronic cloud" inside and outside radius and average radius.

8. Similarly, to $N_{1,2}$ = 17, 18, 19, 20, 21, repeat 3 ~ 7 applications, respectively, the results shown in table 17.1.

Beryllium atom Be internal structure, parameter calculation results table (the radius of the unit A °) 17.1

$N_{1,2}$	17	18	19	20	21
$E_{\theta 1}$	0.2012983478	0.194591632	0.188181261	0.1820344636	0.1761226983
$E_{\theta 2}$	0.4112049615	0.4398212558	0.4648951917	0.4871497652	0.5071027948
$\overline{Z}_1$	3.736786778	3.738120189	3.739262476	3.740248373	3.741105084
$\overline{Z}_2$	1.85469143	1.847584016	1.84127354	1.83563886	1.830581641
$R_{\theta 2(0)}$	0.4549	0.4476	0.4414	0.4362	0.4316
$R_{\theta 2(\pi)}$	1.090	1.1504	1.2084	1.2648	1.3196
$\overline{R}_{\theta 2}$	0.7726	0.7990	0.8249	0.8505	0.8756

Can be seen from table 17.1 calculated results that $N_{1,2}$ = 17, 18, "s type ball shell electron cloud" outside the radius of the atomic radius of 1.0-1.1 A° with experimental data very close, they will be as the following calculation according to the atomic energy level.

17.1.2. Beryllium ion Be^+ internal structure and parameter calculation

Beryllium atomic outer first electronic completely, after the electron spin combination with lithium atoms with elliptical orbit is same, but the number of nuclear power charge shall be 4. According to figure 16.3, equations (16.13), (16.14) and (16.15), to:

$$\begin{cases} \overline{Z}_1 = 4\cos^3\phi_1 - \dfrac{1}{4} - \left[1+\left(\dfrac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}} + tg\phi_1\right)^2\right]^{-1.5} & (17.6-1) \\ \overline{Z}_2 = 4 - 2\left(1+\dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}tg\phi_1\right)\left[\left(\dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}\right)^2 + \left(1+\dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}tg\phi_1\right)^2\right]^{-1.5} & (17.6-2) \\ \dfrac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}} = \dfrac{1}{\cos\phi_1\sqrt{2\sin\phi_1}} & (17.6-3) \\ \dfrac{1}{N_{1,2}^2(2\sin\phi_1)^{1.5}} = \dfrac{4\left[1+2\sin\phi_1+(2\sin\phi_1)^{1.5}\right]^{1.5} - \left[2+(2\sin\phi_1)^{1.5}\right]}{\left(4-1/4\cos^3\phi_1\right)\left[1+2\sin\phi_1+(2\sin\phi_1)^{1.5}\right]^{1.5} - (2\sin\phi_1)^{1.5}} \end{cases}$$

(17.6-4)

Refer to section 1 ~ 8 calculation program, make $N_{\theta 1}$=1, $N_{\theta 2}$=1.5, $\sum \Delta W_{eia}$ = 389.817 ev, $N_{1,2}$ = 16, 17, 18, 19, can a beryllium ion Be^+ each electron spin elliptical orbit parameters, see table 17.2.

Beryllium ion Be^+ electron spin in elliptical orbit parameters calculation results table table 17.2

$N_{1,2}$	$\Phi_1°$	$E_{\theta 1}$	$E_{\theta 2}$	$\bar{Z}_1$	$\bar{Z}_2$
16	1.039281	0.170251801	0.5142742949	3.741544867	2.116412676
17	0.9613	0.165470325	0.5369154899	3.742515504	2.107660264
18	0.89306	0.1609317267	0.5570420175	3.743330151	2.099977322
19	0.832814	0.1566126991	0.5750910309	3.744020279	2.09318866

17.1.3. Beryllium atomic energy level

Beryllium atomic outer first electron in the process of gradually ionization, due to the nucleus and various electronic interactions between the electric field intensity, with each electron spin elliptical orbit position change, calculate difficult, we must first be simplified to it. Figure 17.2, the inner electronic outer $\bar{Z}_i$ has an impact on the value, the outermost electron in the innermost electron $\bar{Z}_i$ values influence can be neglected. See the equations (17.7).

$$\begin{cases} \dfrac{\bar{Z}_1 e^2}{4\pi\varepsilon_0 \bar{R}_{\theta 1}^2} = \dfrac{4e^2}{4\pi\varepsilon_0 \bar{R}_{\theta 1}^2} - \dfrac{e^2}{4\pi\varepsilon_0 (2\bar{R}_{\theta 1})^2} - \dfrac{e^2 \bar{R}_{\theta 1}}{4\pi\varepsilon_0 L_{1,2}^3} & (17.7-1) \\ \dfrac{\bar{Z}_2 e^2}{4\pi\varepsilon_0 \bar{R}_{\theta 2}^2} = \dfrac{4e^2}{4\pi\varepsilon_0 \bar{R}_{\theta 2}^2} - \dfrac{2e^2 \bar{R}_{\theta 2}}{4\pi\varepsilon_0 L_{1.2}^3} - \dfrac{e^2 \bar{R}_{\theta 2}}{4\pi\varepsilon_0 L_{2,3}^3} & (17.7-2) \\ \dfrac{\bar{Z}_3 e^2}{4\pi\varepsilon_0 \bar{R}_{\theta 3}^2} = \dfrac{4e^2}{4\pi\varepsilon_0 \bar{R}_{\theta 3}^2} - \dfrac{e^2}{4\pi\varepsilon_0 (\bar{R}_{\theta 3} + \bar{R}_{\theta 1})^2} - \dfrac{e^2}{4\pi\varepsilon_0 (\bar{R}_{\theta 3} - \bar{R}_{\theta 1})^2} - \dfrac{e^2 \bar{R}_{\theta 3}}{4\pi\varepsilon_0 L_{2,3}^3} \end{cases}$$

（17.7-3）

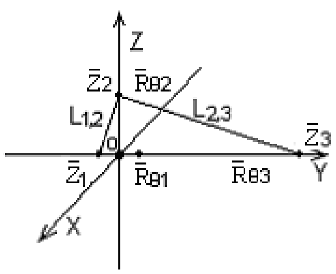


Figure 17.2 beryllium atomic internal electron relative location plans

Simplified to:

$$\begin{cases} \overline{Z}_1 = 3.75 - \left[1 + \left(\dfrac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}}\right)^2\right]^{-1.5} & (17.8\text{-}1) \\ \overline{Z}_2 = 4 - 2\left[1 + \left(\dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}\right)^2\right]^{-1.5} - \left[1 + \left(\dfrac{\overline{R}_{\theta 3}}{\overline{R}_{\theta 2}}\right)^2\right]^{-1.5} & (17.8-2) \\ \overline{Z}_3 = 4 - \left(1 + \dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 3}}\right)^{-2} - \left(1 - \dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 3}}\right)^{-2} - \left[1 + \left(\dfrac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 3}}\right)^2\right]^{-1.5} & (17.8-3) \end{cases}$$

By equations (17.3), (17.8) to:

$$\frac{1}{N_{2,3}^2}\left(\frac{\overline{R}_{\theta 3}}{\overline{R}_{\theta 2}}\right)^3 = \frac{4 - \left(1 + \dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 3}}\right)^{-2} - \left(1 - \dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 3}}\right)^{-2} - \left[1 + \left(\dfrac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 3}}\right)^2\right]^{-1.5}}{4 - 2\left[1 + \left(\dfrac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}\right)^2\right]^{-1.5} - \left[1 + \left(\dfrac{\overline{R}_{\theta 3}}{\overline{R}_{\theta 2}}\right)^2\right]^{-1.5}} \qquad (17.9)$$

Beryllium atoms in the original state, $N_{1,2}$ and take what value? By experimental detection beryllium atomic radius is: 1.0 ~ 1.1 A°, if we consider gold attribute of the element mass outer, can form "free electrons clouds", compound atom outer "probability" have overlapping phenomenon, from table 17.1, $R_{\theta 2(\pi)}$ value, we shall be more than $17 \le N_{1,2} \le 20$. By chapter 16 that: in the calculation of atomic spectrum energy, inner electronic $E_{\theta 1}$, $E_{\theta 2}$ values from atomic state transition to electronic completely after ionization ion condition, therefore, should be through several solutions to the atomic energy level results after comparison and analysis, to determine. We choose the following beryllium atomic energy level simulation of subsequent program:

9. Make beryllium atomic original state $N_{1,2}$ = 19, $N_{\theta 1}$=1、$N_{\theta 2}$=$N_{\theta 3}$=1.5; Ion state $N_{1,2}$= 18, look-up table 17.2 to: $E_{\theta 1}$= 0.1609317267. Electronic ionization in the early stage by stage, $N_{1,2}$ = 19, make $\overline{Z}_1$ = 3.75, $\overline{Z}_2$ =2, $\overline{Z}_3$ =1, $E_{\theta 3}$=0, the related value respectively into (17.3-1), (16.9), to:

$\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$ = 5.774335008, $\overline{R}_{\theta 1}/\overline{R}_{\theta 3}$ = 0.1216696431

10. The $N_{2,3}$ = 2, together generation with $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$ and $\overline{R}_{\theta 1}/\overline{R}_{\theta 3}$ into (17.9), to: $\overline{R}_{\theta 3}/\overline{R}_{\theta 2}$ = 1.421541032.

11. The $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$, $\overline{R}_{\theta 1}/\overline{R}_{\theta 3}$ and $\overline{R}_{\theta 3}/\overline{R}_{\theta 2}$, together generation into equations (17.8) is: $\overline{Z}_1$ =1.896247359, $\overline{Z}_2$ = 3.745031289, $\overline{Z}_3$ = 1.361799586.

12. Will $\overline{Z}_i$, $N_{1,2}$ = 19 value generation into (17.3-1), a new value: $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$ = 5.675214056, together into (16.10), to: $E_{\theta 2}$= 0.48711471. Similarly, will $\overline{Z}_2$, $\overline{Z}_3$, $E_{\theta 2}$, $\overline{R}_{\theta 3}/\overline{R}_{\theta 2}$, $N_{\theta i}$ values generation into (16.10), to: $E_{\theta 3}$= 0.5028773261.

13. The corresponding $\overline{Z}_i$, $E_{\theta i}$, $N_{\theta i}$, values generation into (15.11), respectively, to atomic ionization energy always: $\sum \Delta W_{eib}$ = 396.7249634 ev.

14. Will in the new $\overline{Z}_i$, $E_{\theta i}$ values equivalent repeat 9 ~ 13 calculation procedure, until $\sum \Delta W_{eic}$ = 396.6746814 ev is constant.

15. Because $\sum \Delta W_{ei0}$ = 399.139 ev, by (16.11), to the atomic energy level: △Wei== 2.464318621 ev

16. Appropriate fine-tuning $E_{\theta 1}$, repeated 9 ~ 15 calculation program, finally to: when the $E_{\theta 1}$=0.16291, $\sum \Delta W_{eic}$ =396.4137961ev, the atomic energy level $\triangle W_{ei}$ = 2.7252 ev.

17. Similarly, to $N_{1,2}$ = 19, $N_{\theta 1}$=1, $N_{\theta 2}$=1.5，$E_{\theta 1}$= 0.1609317267 are invariable values, $N_{2,3}$ = 3, 4, 5,... 17, $N_{\theta 3}$= 1.5, 2, 3, respectively, repeat 9 ~ 15 calculation procedures, the atomic energy level is obtained data in table 17.3.

Beryllium atomic energy level the results table table 17.3

$N_{\theta 3}$	$N_{2,3}$	$E_{\theta 2}$	$E_{\theta 3}$	$\sum \Delta W_{eib}$ ev	$\triangle W_{ei}$ev	实验值 ev
	2	0.4885102797	0.5007187202	396.6746814	2.46431862	
1.5	2	0.4890225186	0.5012105588	396.4137961 ($E_{\theta 1}$=0.16291)	2.7252	2.7252
	3	0.5257743248	0.614642384	394.8973346	4.24166542	
	4	0.5423980572	0.1703480027	393.9081965	5.23080346	5.277
	5	0.5514043688	0.3534888217	393.2697172	5.86928278	
	6	0.5568658315	0.4458191133	392.8190209	6.31997907	6.457
	7	0.5604365389	0.5081348784	392.4813773	6.65762267	6.779
	8	0.5629017353	0.5545636931	392.2174938	6.92150621	6.997
	9	0.5646758664	0.5910803536	392.0046365	7.13436350	7.289
2	10	0.5659953146	0.6208284993	391.8286858	7.31031422	7.401
	11	0.5670031918	0.645677859	391.6803794	7.45862057	7.462
	12	0.5677903612	0.6668330452	391.5533719	7.58562806	
	13	0.5684168028	0.6851154238	391.4431596	7.69584041	7.694
	14	0.5689234196	0.7011093504	391.3464508	7.79254916	
	15	0.5693388871	0.7152445721	391.2607798	7.87822017	
	16	0.569683793	0.7278456763	391.1842599	7.95474011	7.988

	17	0.5699732282	0.7391632732	391.1154209	8.02357909	7.998
3	18	0.5702184581	0.1165424905	391.053099	8.08590100	8.089

Beryllium atomic energy level the results table table 17.4

$N_{\theta3}$	$N_{2,3}$	$E_{\theta2}$	$E_{\theta3}$	$\sum \Delta W_{eib}$ ev	ΔW_{ei}ev	实验值 ev
3	19	0.5608957448	0.1670646209	391.3062219	7.83277807	
4	46	0.5625401157	0.0871176480	390.6100692	8.52893079	8.335
5	91	0.5628081284	0.0783784698	390.2953222	8.84367777	8.865

18. Make $N_{1,2}$=18.5、$N_{\theta1}$=1、$N_{\theta2}$=1.5，$E_{\theta1}$=0.1609317267 all are constants, $N_{\theta3}$=3, 4, 5, $N_{2,3}$ = 19, 20, 46, 91... (46, 91 values is by simulation in equation (17.3 2) find out), repeat calculation procedure, 9 to 15 respectively corresponding to the atomic energy level in table 17.4.

19. Make $N_{1,2}$=20、$N_{\theta1}$=1、$N_{\theta2}$=1.5; Ion state $N_{1,2}$ = 19, look-up table 17.2: $E_{\theta1}$= 0.1566126991 are constants, $N_{\theta3}$=1.5, 2, 3, $N_{2,3}$ = 2, 3,......17, repeated 9 ~ 17 calculation procedure, respectively, to beryllium atoms and ions to another state, the outer electronic ionization step by step in the process of atomic energy level, see table 17.5.

Beryllium atomic energy level the results table table 17.5

$N_{\theta3}$	$N_{2,3}$	$E_{\theta2}$	$E_{\theta3}$	$\sum \Delta W_{eib}$ ev	ΔW_{ei}ev	实验值 ev
1.5	2	0.5105035709	0.5278616424	396.4879154	2.65108456	2.725
	3	0.5452401981	0.632230023	394.7520959	4.38690412	
	4	0.5608293013	0.2497425916	393.7890729	5.34992714	5.277
	5	0.5692968151	0.393149501	393.1683692	5.97063081	
	6	0.5744387584	0.4749794477	392.7306094	6.40839063	6.457
	7	0.5778034894	0.531872743	392.4028537	6.73614630	6.779
	8	0.5801278393	0.5748638351	392.1468091	6.99219089	6.997
2	9	0.5818013026	0.608960831	391.9403429	7.19865711	7.289
	10	0.5830462663	0.6368931379	391.7697191	7.36928086	7.401
	11	0.583997472	0.6603191363	391.6259327	7.51306734	7.462
	12	0.5847405177	0.680322739	391.5028169	7.63618312	7.694
	13	0.5853319329	0.6976506922	391.3959968	7.74300320	
	14	0.5858102814	0.7128384159	391.302276	7.83672404	
	15	0.586202606	0.7262820654	391.2192604	7.91973963	7.988
	16	0.5865283271	0.7382823124	391.1451188	7.99388120	7.998
3	17	0.5868016826	0.1117841642	391.0784246	8.06057538	8.089

20. Similarly, to $N_{1,2}$ = 19.5, $N_{\theta1}$=1, $N_{\theta2}$=1.5, $E_{\theta1}$= 0.1566126991 are constants, $N_{\theta3}$= 3, 4, 5, 6, $N_{2,3}$=, 44, 86, 86, 18 ($N_{2,3}$ values are from (17.3 2) equation obtained in simulation), repeat calculation program 9 ~15, respectively, to find out the corresponding beryllium atoms in each level, see table 17.6.

Beryllium atomic energy level the results table table 17.6

$N_{\theta 3}$	$N_{2,3}$	$E_{\theta 2}$	$E_{\theta 3}$	$\sum \Delta W_{eib}$ ev	ΔW_{ei} ev	实验值 ev
3	18	0.5784419544	0.1710758722	391.3049719	7.83402811	7.988
4	44	0.5801639669	0.1121071297	390.6006239	8.53837613	
5	86	0.5804371661	0.0509308779	390.2913574	8.84764257	8.865
6	149	0.5805030462	0.0216456788	390.1232882	9.01571181	

By comparing table 17.3 ~ 17.6 calculated results can be seen: beryllium atomic original state, $N_{1,2} = 20$, ionic state $N_{1,2} = 19$ calculation results with the experimental value more, as long as we fine tune $E_{\theta 1}$ value, can with the experimental values are equal, but have no the necessary.

21. To $N_{1,2}$=19.5, $N_{\theta 1}$=1, $N_{\theta 2}$=1.5, $N_{\theta 3}$=5, $N_{2,3}$=86, 87, …… 92, $E_{\theta 1}$=0.1566126991, respectively, repeat 9 ~ 15 calculation procedures, can work out another group of beryllium atomic energy level data, including $N_{2,3}$ doesn't have to take continuous natural number, it can be 2, 3, 4,... Multiple of, depending on specific experimental data, see table 17.7.

Beryllium atomic energy level the results table table 17.7

$N_{\theta 3}$	$N_{2,3}$	$E_{\theta 2}$	$E_{\theta 3}$	$\sum \Delta W_{eib}$ ev	ΔW_{ei} ev	实验值 ev
	86	0.5804371661	0.0509308779	390.2913574	8.84764257	
	87	0.5804394137	0.1006931801	390.2871485	8.85185147	
	88	0.5804415857	0.1324521788	390.2830196	8.8559804	
5	89	0.5804436855	0.1575166242	390.2789684	8.86003163	
	90	0.5804457163	0.1787367217	390.2749924	8.86400762	8.865
	91	0.580447681	0.1973661221	390.2710895	8.86791052	
	92	0.5804495825	0.2140907961	390.2672575	8.87174246	

To sum up, to more than the atomic energy level, according to the model of the book, the choice of appropriate $N_{1,2}$ and $N_{2,3}$ quantum number, fine-tuning $E_{\theta 1}$ parameters, we can calculate all the atomic energy level. Deficiency is laboratory is not directly determining electron spin elliptical orbit parameters, we can only from the atomic energy level or spectra experiment energy to reverse simulation.

17.2 Boron atom internal structure, parameters

And the atomic energy level

17.2.1. Boron atom internal structure and parameter calculation

According to the experimental determination, the boron atom within five electronic ionization energy, respectively, 8.298, 25.154, 37.930, 259.368 and 340.217 ev, total ionization energy $\sum \Delta W_{ei0} = 670.967$ ev. Atomic radius are 0.8 ~ 1.0 A °, the atomic energy level in table 17.10 and table 17.11. Refer to section 17.1

and figure 17.2, boron atoms in electron spin elliptical orbit combination shall be as shown in figure 17.3, to stability. We cut out Φ_1 Angle offset effects, by Newtonian mechanics; Coulomb's law (17.10) is derived equations.

$$\begin{cases} \frac{\bar{Z}_1 e^2}{4\pi\varepsilon_0 \bar{R}_{\theta1}^2} = \frac{5e^2}{4\pi\varepsilon_0 \bar{R}_{\theta1}^2} - \frac{e^2}{4\pi\varepsilon_0 (2\bar{R}_{\theta1})^2} - \frac{2e^2 \bar{R}_{\theta1}}{4\pi\varepsilon_0 L_{1,2}^3} & (17.10-1) \\ \frac{\bar{Z}_2 e^2}{4\pi\varepsilon_0 \bar{R}_{\theta2}^2} = \frac{5e^2}{4\pi\varepsilon_0 \bar{R}_{\theta2}^2} - \frac{e^2}{4\pi\varepsilon_0 (2\bar{R}_{\theta2})^2} - \frac{2e^2 \bar{R}_{\theta2}}{4\pi\varepsilon_0 L_{1,2}^3} - \frac{e^2 \bar{R}_{\theta2}}{4\pi\varepsilon_0 L_{2,3}^3} & (17.10-2) \\ \frac{\bar{Z}_3 e^2}{4\pi\varepsilon_0 \bar{R}_{\theta3}^2} = \frac{e^2}{4\pi\varepsilon_0}\left[\frac{5}{\bar{R}_{\theta3}^2} - \frac{2\bar{R}_{\theta3}}{L_{2,3}^3} - \frac{1}{(\bar{R}_{\theta3} + \bar{R}_{\theta1})^2} - \frac{1}{(\bar{R}_{\theta3} - \bar{R}_{\theta1})^2}\right] & (17.10\text{-}3) \end{cases}$$

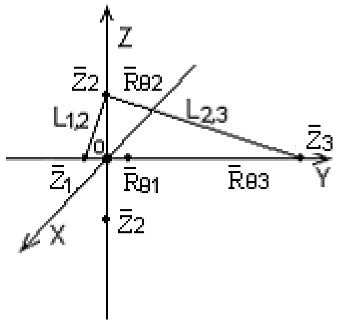


Figure 17.3 in boron atom electronic relative location plan

Simplified to:

$$\begin{cases} \bar{Z}_1 = 4.75 - 2\left[1 + \left(\frac{\bar{R}_{\theta2}}{\bar{R}_{\theta1}}\right)^2\right]^{-1.5} & (17.11-1) \\ \bar{Z}_2 = 4.75 - 2\left[1 + \left(\frac{\bar{R}_{\theta1}}{\bar{R}_{\theta2}}\right)^2\right]^{-1.5} - \left[1 + \left(\frac{\bar{R}_{\theta3}}{\bar{R}_{\theta2}}\right)^2\right]^{-1.5} & (17.11-2) \\ \bar{Z}_3 = 5 - \left(1 + \frac{\bar{R}_{\theta1}}{\bar{R}_{\theta3}}\right)^{-2} - \left(1 - \frac{\bar{R}_{\theta1}}{\bar{R}_{\theta3}}\right)^{-2} - 2\left[1 + \left(\frac{\bar{R}_{\theta2}}{\bar{R}_{\theta3}}\right)^2\right]^{-1.5} & (17.11-3) \end{cases}$$

Will (15.41) into (17.11-2), (17.11-3), to:

$$\frac{1}{N_{2,3}^2}\left(\frac{\overline{R}_{\theta3}}{\overline{R}_{\theta2}}\right)^3 = \frac{5-\dfrac{1}{\left(1+\dfrac{\overline{R}_{\theta1}}{\overline{R}_{\theta3}}\right)^2}-\dfrac{1}{\left(1-\dfrac{\overline{R}_{\theta1}}{\overline{R}_{\theta3}}\right)^2}-\dfrac{2}{\left[1+\left(\dfrac{\overline{R}_{\theta2}}{\overline{R}_{\theta3}}\right)^2\right]^{1.5}}}{4.75-\dfrac{2}{\left[1+\left(\dfrac{\overline{R}_{\theta1}}{\overline{R}_{\theta2}}\right)^2\right]^{1.5}}-\dfrac{1}{\left[1+\left(\dfrac{\overline{R}_{\theta3}}{\overline{R}_{\theta2}}\right)^2\right]^{1.5}}} \quad (17.12)$$

By (15.41), (15.12):

$$\begin{cases} \dfrac{\overline{R}_{\theta2}}{\overline{R}_{\theta1}} = \sqrt[3]{N_{1,2}^2\dfrac{\overline{Z}_2}{\overline{Z}_1}} & (17.13-1) \\ E_{\theta2} = \sqrt{1-\left(N_{\theta2}/N_{\theta1}\right)^2(1-E_{\theta1}^2)\dfrac{\overline{Z}_1\overline{R}_{\theta1}}{\overline{Z}_2\overline{R}_{\theta2}}} & (17.13-2) \\ E_{\theta3} = \sqrt{1-\left(N_{\theta3}/N_{\theta2}\right)^2(1-E_{\theta2}^2)\dfrac{\overline{Z}_2\overline{R}_{\theta2}}{\overline{Z}_3\overline{R}_{\theta3}}} & (17.13-3) \\ \dfrac{\overline{R}_{\theta1}}{\overline{R}_{\theta3}} = \dfrac{\overline{Z}_3(1-E_{\theta3}^2)N_{\theta1}^2}{\overline{Z}_1(1-E_{\theta1}^2)N_{\theta3}^2} & (17.13-4) \end{cases}$$

Boron atom internal structure, each electron spin elliptical orbit parameters simulation program is as follows:

1. Make $N_{\theta1}$=1, $N_{\theta2}=N_{\theta3}$=1.5, $N_{1,2}$=17, $\overline{Z}_1$=4.75, $\overline{Z}_2$=2.75, $\overline{Z}_3$=1, $E_{\theta1}$=0.1, $E_{\theta3}$=0, respectively into (17.13-1), (17.13-4), to: $\overline{R}_{\theta2}/\overline{R}_{\theta1}$ = 5.510347347, $\overline{R}_{\theta1}/\overline{R}_{\theta3}$ = 0.09451237521.

2. Make the $N_{2,3}$ = 1, will be together $\overline{R}_{\theta2}/\overline{R}_{\theta1}$, and $\overline{R}_{\theta1}/\overline{R}_{\theta3}$ in to (17.12), to: $\overline{R}_{\theta3}/\overline{R}_{\theta2}$ = 0.971354264.

3. Will $\overline{R}_{\theta2}/\overline{R}_{\theta1}$, $\overline{R}_{\theta1}/\overline{R}_{\theta3}$, and $\overline{R}_{\theta3}/\overline{R}_{\theta2}$ value respectively generation into equations (17.11) is: $\overline{Z}_1$=4.738613655, $\overline{Z}_2$=2.475810775, $\overline{Z}_3$= 2.269083104.

4. Will $\overline{Z}_i$, $N_{\theta i}$, $N_{1,2}$=17, $\overline{R}_{\theta2}/\overline{R}_{\theta1}$, $\overline{R}_{\theta1}/\overline{R}_{\theta3}$, $E_{\theta1}$=0.1, value generation to equations (17.13) are respectively: $\overline{R}_{\theta2}/\overline{R}_{\theta1}$=5.325021063, $\overline{R}_{\theta1}/\overline{R}_{\theta3}$=0.2135021, $E_{\theta2}$=0.4465120303, $E_{\theta3}$=0.3172835642.

5. Will $\overline{Z}_i$, $N_{\theta i}$, $E_{\theta i}$ values generation into (15.11), respectively is five electronic total ionization energy: $\sum\Delta W_{ei0}$ = 692.2587889 ev.

Boron atom internal structure, parameter calculation results table (the radius of the unit A°) 17.8

$N_{1,2}$	16	17	18	19	20
$\overline{Z}_1$	4.735866103	4.737393859	4.738687511	4.739792467	4.740743642

$\bar{Z}_2$	2.474483909	2.468725932	2.463593351	2.458999284	2.454870288
$\bar{Z}_3$	2.076414537	2.097001777	2.114482795	2.12949919	2.142527476
$E_{\theta 1}$	0.2049905362	0.1944862044	0.1841990858	0.1740809	0.1640807263
$E_{\theta 2}$	0.4397305292	0.4681501595	0.4928926473	0.514732940	0.5342219851
$E_{\theta 3}$	0.138390543 i	0.1713469525	0.2680612289	0.330936171	0.3784422718
$R_{\theta 2(0)}$	0.334210	0.328504	0.323732	0.319661	0.316131
$R_{\theta 2(\pi)}$	0.858820	0.906821	0.953048	0.997802	1.041301
$\bar{R}_{\theta 2}$	0.596514	0.617663	0.638390	0.658731	0.678716
$R_{\theta 3(0)}$		0.484729	0.444058	0.420096	0.403152
$R_{\theta 3(\pi)}$		0.685192	0.769316	0.835677	0.894079
$\bar{R}_{\theta 3}$	0.562640	0.584961	0.606687	0.627887	0.648615

6. With a new $\bar{Z}_i$ and $E_{\theta 3}$ values, generation into the (17.13-1), (17.13-4) type, repeated calculation procedure, 1 ~ 5 until $\sum \Delta W_{eia}$ = 690.3705144 ev is constant, slightly greater than the value $\sum \Delta W_{ei0}$ = 670.967 ev.

7. Adjust $E_{\theta 1}$ scope, repeated 1 ~ 6 calculation procedures, the last to: when the $E_{\theta 1}$= 0.1944862044, $\sum \Delta W_{eia}$ =670.967 ev.

8. Similarly, to $N_{1,2}$ = 16, 18, 19, 20, repeated 1 ~ 7 applications, to electronic $\bar{Z}_i$, $E_{\theta i}$ are obtained.

9. Will each, $\bar{Z}_i$, $E_{\theta i}$, $N_{\theta i}$ value generation into (15.7), (15.12), respectively, make to θ_i=0, π, can get the electron spin elliptical orbit parameters, see table 17.8.

17.2.2, boron ions B^+ internal structure and parameter calculation

Refer to section 17.1 figure 17.1 and figure 17.4 beryllium atomic internal structure calculation model, because the number of nuclear power load is 5, we have:

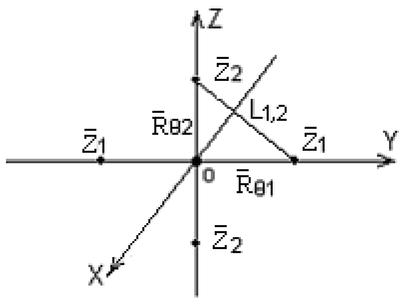


Figure 17.4 boron ion in electronic relative location plan

Simplified to:

$$\begin{cases} \dfrac{\overline{Z}_1 e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} = \dfrac{5e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} - \dfrac{e^2}{4\pi\varepsilon_0 (2\overline{R}_{\theta 1})^2} - \dfrac{2e^2 \overline{R}_{\theta 1}}{4\pi\varepsilon_0 L_{1,2}^3} & (17.14-1) \\ \dfrac{\overline{Z}_2 e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} = \dfrac{5e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} - \dfrac{e^2}{4\pi\varepsilon_0 (2\overline{R}_{\theta 2})^2} - \dfrac{2e^2 \overline{R}_{\theta 2}}{4\pi\varepsilon_0 L_{1,2}^3} & (17.14-2) \end{cases}$$

By the simplified equation (17.14), to:

$$\begin{cases} \overline{Z}_1 = 4.75 - 2\left[1 + \left(\overline{R}_{\theta 2}/\overline{R}_{\theta 1}\right)^2\right]^{-1.5} & (17.15-1) \\ \overline{Z}_2 = 4.75 - 2\left[1 + \left(\overline{R}_{\theta 1}/\overline{R}_{\theta 2}\right)^2\right]^{-1.5} & (17.15-2) \end{cases}$$

By (17.3 1) type, simultaneous equations (17.15):

$$\frac{1}{N_{1,2}^2}\left(\frac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}}\right)^3 = \frac{4.75 - 2\left[1 + \left(\overline{R}_{\theta 1}/\overline{R}_{\theta 2}\right)^2\right]^{-1.5}}{4.75 - 2\left[1 + \left(\overline{R}_{\theta 2}/\overline{R}_{\theta 1}\right)^2\right]^{-1.5}} \qquad (17.16)$$

According to equations (17.13), (17.15), (17.16), (15.7) and (15.12), refer to section 17.1 beryllium atomic 1 ~ 9 calculation procedures, make $\sum \Delta W_{ei0}$ = 662.669 ev, obtained boron ions B + inner structure parameters, see table 17.9).

Boron B^+ inner structure parameters calculation results table (radius nit A°) 17.9

$N_{1,2}$	17	18	19	20	21
$\overline{Z}_1$ $\overline{Z}_2$	4.738998376 2.842752291	4.740129133 2.83633042	4.741094833 2.830643113	4.741926007 2.825576514	4.742646456 2.821038609
$E_{\theta 1}$ $E_{\theta 2}$	0.1448008043 0.5843090113	0.1330941967 0.6015065491	0.1213038073 0.6170099394	0.1092638506 0.6310771482	0.0967493541 0.643913695
$R_{\theta 1(0)}$	0.0975404	0.098525	0.099540	0.100603	0.101736
$R_{\theta 1(\pi)}$	0.130571	0.128777	0.127023	0.125284	0.123530
$\overline{R}_{\theta 1}$	0.114056	0.113651	0.113282	0.112944	0.112633
$R_{\theta 2(0)}$	0.264366	0.262119	0.260127	0.258346	0.256741
$R_{\theta 2(\pi)}$	1.007567	1.053430	1.098275	1.142197	1.185276
$\overline{R}_{\theta 2}$	0.635966	0.657774	0.679201	0.700272	0.721008

17.2.3. Boron atomic energy level

A boron atom the outermost electrons in the process of gradually ionization, inner $N_{\theta 1}$, $N_{\theta 2}$, $N_{1,2}$ values will remain unchanged. Make to: $\sum \Delta W_{ei0}$ = 670.967 ev, $N_{1,2}$=17、$N_{\theta 1}$=1、$N_{\theta 2}$=1.5、$N_{\theta 3}$=1.5、2、2.5、3、4、5 and 10^5, $E_{\theta 1}$=0.1944862044～0.1448008043, $N_{2,3}$ value from (17.3-2) insertion 1~7 simulation calculation procedure, condition is: $0 \le E_{\theta 3} \le 1$. Reference 1 ~ 7 calculation procedure, calculate boron atoms in outer electrons ionization the $\sum \Delta W_{eic}$ value in each step by step, and then from (16.11) - is the atomic energy level ΔW_{ei} value, as shown in the table 17.10.

Boron atomic energy level the results table table 17.10

$N_{\theta 3}$	$N_{2,3}$	$E_{\theta 1}$	$E_{\theta 2}$	$E_{\theta 3}$	$\sum \Delta W_{eib}$ ev	ΔW_{ei}ev	实 验 值 ev
1.5	4	0.144801	0.56149478	0.621531	669.674	1.29299995	
	5	0.144801	0.56786633	0.653430	668.598496	2.36850389	
	6	0.144801	0.57185724	0.201196	667.852777	3.11422315	
	6	0.147100	0.57226043	0.202824	667.395	3.572	3.572
2	7	0.144801	0.57453711	0.301624	667.301818	3.66518230	
	11	0.144801	0.57968227	0.490741	666.022431	4.94456875	4.9642
	12	0.144801	0.58032630	0.519210	665.823213	5.14378664	
2.5	18	0.144801	0.58237156	0.248970	665.048042	5.91895780	5.9335
	19	0.144801	0.58255340	0.296526	664.961054	6.00594614	
3	32	0.144801	0.58364601	0.128716	664.274596	6.69240384	6.7900
	36	0.144801	0.58377951	0.287142	664.151456	6.81554380	6.8202
4	80	0.144801	0.58419703	0.074386	663.535165	7.43183530	7.4377
	84	0.144801	0.57420729	0.190009	663.507301	7.45969898	7.4572
5	158	0.144801	0.58427989	0.021236	663.218348	7.74865180	7.7467
	162	0.144801	0.58428130	0.129211	663.209248	7.75775188	
10^5		0.144801	0.58430901	1.2×10^{-7}	662.669	8.298	8.2983

Similarly, make: $\sum \Delta W_{ei0}$ = 670.967 ev, $N_{1,2}$ = 19, $E_{\theta 1}$= 0.1740809-0.1213038073, repeat the above calculation procedure, we can find another series of boron atoms each level value, as shown in the table 17.11.

Boron atomic energy level the results table table 17.11

$N_{\theta 3}$	$N_{2,3}$	$E_{\theta 1}$	$E_{\theta 2}$	$E_{\theta 3}$	$\sum \Delta W_{eib}$ ev	ΔW_{ei}ev	实验值 ev
	5	0.12130381	0.60237754	0.224922	668.232679	2.73432124	
	6	0.12130381	0.60592103	0.324466	667.530163	3.43683736	3.572
2	7	0.12130381	0.60830322	0.389918	667.011653	3.95534718	
	10	0.12130381	0.61215807	0.511650	666.028987	4.93801256	4.9642
	11	0.12130381	0.61288327	0.539633	665.809381	5.15761938	
2.5	16	0.12130381	0.61487097	0.264517	665.084565	5.88243464	
	17	0.12130381	0.61509214	0.312709	664.985160	5.98184009	5.9335
3	28	0.12130381	0.61624762	0.085725	664.313641	6.65335869	6.7900
4	72	0.12130381	0.61688692	0.075813	663.538296	7.42870380	7.4377
5	143	0.12130381	0.61697823	0.049277	663.218088	7.74891189	7.7467
10^5		0.12130381	0.61700994	0.0	662.669	8.298	8.2983

As can be seen in table 17.10 and table 17.11: $N_{1,2}$ = 17, 19 two series of parameters in $E_{\theta 1}$ changes extremely hours, are consistent with experimental data.

17.3 Carbon atoms internal structure, parameters

And the atomic energy level

17.3.1. Carbon atoms internal structure, parameters are calculated

Experimental determination of carbon atoms outer four electronic ionization energy, respectively, 11.260, 24.383, 47.887 and 64.492 ev. Atomic radius are 0.7 ~ 0.8 A°.

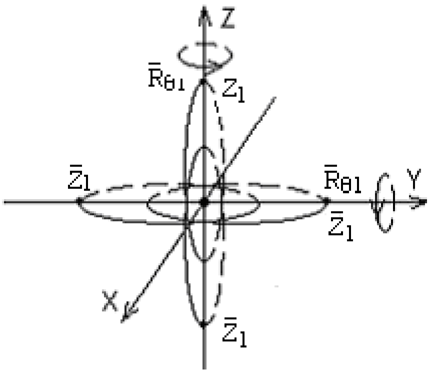


Figure 17.5 carbon atoms outer four electron spin track group

Because carbon atoms outer four electron spin elliptical orbit parameters are the same, "cloud" of two rotating ellipsoid surface, see figure 17.5, we have:

$$\frac{\bar{Z}_1 e^2}{4\pi\varepsilon_0 \bar{R}_{\theta 1}^2} = \frac{3.75e^2}{4\pi\varepsilon_0 \bar{R}_{\theta 1}^2} - \frac{2e^2 \bar{R}_{\theta 1}}{4\pi\varepsilon_0 (2\bar{R}_{\theta 1}^2)^{1.5}} \quad (17.17)$$

By (17.17), to: $\bar{Z}_1 = 3.75 - 1/\sqrt{2} = 3.0428932$, to:

$$E_{\theta i} = \sqrt{1 - \frac{2\sum \Delta W_{eia} N_{\theta i}^2 e}{m_{e0} N_e (\bar{Z}_i a_c c)^2}} \quad (17.18)$$

By (15.11), make to economical electronic number of N_e, obtained:

Make $N_{\theta 1}$=1.5, $\sum \Delta W_{ei0}$ =148.022ev, N_e=4, will $\bar{Z}_1$ value generation into (17.18), to: $E_{\theta 1}$= 0.5822983738.

By (15.7), (15.12), make the θ_1=0, π, obtained carbon atoms outer four electrons spin elliptical orbit parameters are: $R_{\theta 1(0)}$=0.247291A°, $R_{\theta 1(\pi)}$=0.936765A°, $\bar{R}_{\theta 1}$=0.592028A°.

17.3.2. Carbon ion internal structure, parameters are calculated

Carbon atoms outer an electronic completely after ionization, electron spin elliptical orbit combination similar lithium atoms, but $N_{\theta 1}$=1.5, $N_{1,2}$=1, nuclear power charge for 4, see figure 17.6. Because the inner electronic external layer of symmetry electric repelling force balances effect, $\overline{Z}_1$ electronic translation angle Φ_1 negligible, we have:

$$\begin{cases} \frac{\overline{Z}_1 e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} = \frac{3.75e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} - \frac{e^2 \overline{R}_{\theta 1}}{4\pi\varepsilon_0 L_{1,2}^3} & (17.19-1) \\ \frac{\overline{Z}_2 e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} = \frac{4e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} - \frac{2e^2 \overline{R}_{\theta 2}}{4\pi\varepsilon_0 L_{1,2}^3} & (17.19-2) \end{cases}$$

Simplified to:

$$\begin{cases} \overline{Z}_1 = 3.75 - \left[1 + \left(\overline{R}_{\theta 2} \big/ \overline{R}_{\theta 1}\right)^2\right]^{-1.5} & (17.20-1) \\ \overline{Z}_2 = 4 - 2\left[1 + \left(\overline{R}_{\theta 1} \big/ \overline{R}_{\theta 2}\right)^2\right]^{-1.5} & (17.20-1) \end{cases}$$

By (15.12), (16.9) - (17.20) and equations united stand:

$$\frac{1}{N_{1,2}^2}\left(\frac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}}\right)^3 = \frac{4 - 2\left[1 + \left(\frac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}\right)^2\right]^{-1.5}}{3.75 - \left[1 + \left(\frac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}}\right)^2\right]^{-1.5}} \qquad (17.21)$$

By equations (17.13) to:

$$E_{\theta 2} = \sqrt{1 - \left(\frac{N_{\theta 2}}{N_{\theta 1}}\right)^2 \frac{\overline{Z}_1 \overline{R}_{\theta 1}}{\overline{Z}_2 \overline{R}_{\theta 2}} (1 - E_{\theta 1}^2)} \qquad (17.22)$$

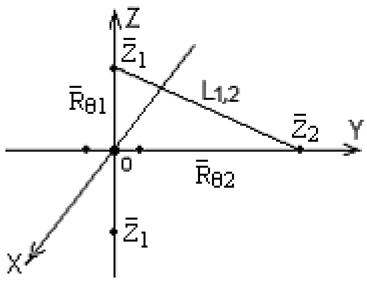


Figure 17.6 carbon ions within C^+ 5 electronic relative locations

Carbon ion internal structure, parameters of the simulation program are as follows:

1. Make the $N_{1,2} = 1$, generation of (17.21) in type, too: $\overline{R}_{\theta 2} / \overline{R}_{\theta 1} = 0.9911356941$.

2. Will $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$ = 0.9911356941value generation into (17.20) equations to: $\overline{Z}_1$ = 3.391714272 and $\overline{Z}_2$ =3.302315853.

3. Make $N_{\theta 1}=N_{\theta 2}=1.5$, $E_{\theta 1}=0.5$, and $\overline{Z}_1$, $\overline{Z}_2$, $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$ generation into (17.22) with, to: $E_{\theta 2}$= 0.4720245236.

4. The above all kinds of generation into (15.11), respectively is general ionization energy $\sum \Delta W_{ei0}$ = 155.5953768 ev, with carbon ion outer 3 electronic total ionization energy $\sum \Delta W_{ei0}$ = 136.762 ev, slightly bigger.

5. Adjust $E_{\theta 1}$ value, repeat 2 ~ 4 calculation procedure, finally to: when the $E_{\theta 1}$=0.583764115, $\sum \Delta W_{ei0}$ = 136.762 ev.

6. By (15.7), (15.12), make theθ_i =0, π, obtained carbon ion electron spin elliptical orbit parameters are:

$E_{\theta 1}$=0.583764115 $E_{\theta 2}$=0.5629201852

$R_{\theta 1(0)}$=0.221653A° $R_{\theta 1(\pi)}$=0.843383A° $\overline{R}_{\theta 1}$ =0.532518A°

$R_{\theta 2(0)}$=0.230690A° $R_{\theta 2(\pi)}$=0.824906A° $\overline{R}_{\theta 2}$ =0.527798A°

17.3.4. Carbon atomic energy level

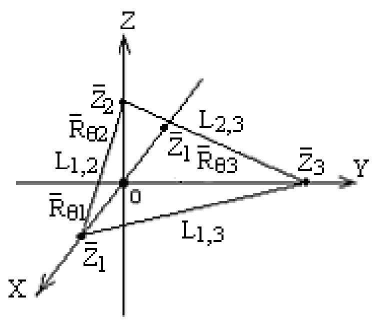


Figure 17.7 carbon ions in the electronic location plan

Carbon atoms outer an electron in the process of gradually ionization, the electron spin elliptical orbit combination model as shown in figure 17.7, we have:

$$\begin{cases} \frac{\overline{Z}_1 e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} = \frac{3.75e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 1}^2} - \frac{e^2 \overline{R}_{\theta 1}}{4\pi\varepsilon_0 L_{1,2}^3} - \frac{e^2 \overline{R}_{\theta 1}}{4\pi\varepsilon_0 L_{1,3}^3} & (17.23-1) \\ \frac{\overline{Z}_2 e^2}{4\pi\varepsilon \ \overline{R}_{\theta 2}^2} = \frac{4e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 2}^2} - \frac{2e^2 \overline{R}_{\theta 2}}{4\pi\varepsilon_0 L_{1,2}^3} - \frac{e^2 \overline{R}_{\theta 2}}{4\pi\varepsilon_0 L_{2,3}^3} & (17.23-2) \\ \frac{\overline{Z}_3 e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 3}^2} = \frac{4e^2}{4\pi\varepsilon_0 \overline{R}_{\theta 3}^2} - \frac{2e^2 \overline{R}_{\theta 3}}{4\pi\varepsilon_0 L_{1,.3}^3} - \frac{e^2 \overline{R}_{\theta 3}}{4\pi\varepsilon_0 L_{2,3}^3} & (17.23-3) \end{cases}$$

Simplified as:

$$\begin{cases} \overline{Z}_1 = 3.75 - \left[1 + \left(\frac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 1}}\right)^2\right]^{-1.5} - \left[1 + \left(\frac{\overline{R}_{\theta 3}}{\overline{R}_{\theta 1}}\right)^2\right]^{-1.5} & (17.24-1) \\ \overline{Z}_2 = 4 - 2\left[1 + \left(\frac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}\right)^2\right]^{-1.5} - \left[1 + \left(\frac{\overline{R}_{\theta 3}}{\overline{R}_{\theta 2}}\right)^2\right]^{-1.5} & (17.24-2) \\ \overline{Z}_3 = 4 - 2\left[1 + \left(\frac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 3}}\right)^2\right]^{-1.5} - \left[1 + \left(\frac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 3}}\right)^2\right]^{-1.5} & (17.24-3) \end{cases}$$

Simultaneous (15.41), (17.24-2), (17.24 3) type, obtained:

$$\frac{1}{N_{2,3}^2}\left(\frac{\overline{R}_{\theta 3}}{\overline{R}_{\theta 2}}\right)^3 - \frac{4 - 2\left[1 + \left(\frac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 3}}\right)^2\right]^{-1.5} - \left[1 + \left(\frac{\overline{R}_{\theta 2}}{\overline{R}_{\theta 3}}\right)^2\right]^{-1.5}}{4 - 2\left[1 + \left(\frac{\overline{R}_{\theta 1}}{\overline{R}_{\theta 2}}\right)^2\right]^{-1.5} - \left[1 + \left(\frac{\overline{R}_{\theta 3}}{\overline{R}_{\theta 2}}\right)^2\right]^{-1.5}} \quad (17.25)$$

By (15.41), (15.12), to:

$$N_{2,3} = \left(\frac{N_{\theta 3}}{N_{\theta 2}}\right)^3 \left(\frac{\overline{Z}_2}{\overline{Z}_3}\right)^2 \left(\frac{1 - E_{\theta 2}^2}{1 - E_{\theta 3}^2}\right)^{1.5} \quad (17.26)$$

Carbon atomic energy level simulation procedure is as follows:

7. Make $N_{\theta 1}=N_{\theta 2}=N_{\theta 3}=1.5$, $N_{1,2}=N_{2,3}=1$, $E_{\theta 1}=0.58$, $E_{\theta 2}=E_{\theta 3}=0$, $\overline{Z}_1=3.4$, $\overline{Z}_2=3.3$, $\overline{Z}_3=1$, and in turn into (17.13-4), (17.13-1) type, to: $\overline{R}_{\theta 1}/\overline{R}_{\theta 3} = 0.4432152608$, $\overline{R}_{\theta 2}/\overline{R}_{\theta 1} = 0.9900983595$.

8. Will the $N_{2,3}$, $\overline{R}_{\theta 1}/\overline{R}_{\theta 3}$, $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$, together into (17.25), to: $\overline{R}_{\theta 3}/\overline{R}_{\theta 2} = 0.907849102$.

9. Will the $\overline{R}_{\theta 1}/\overline{R}_{\theta 3}$, $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$ and $\overline{R}_{\theta 3}/\overline{R}_{\theta 2}$ values generation to equations (17.24) are respectively: $\overline{Z}_1=3.32462785$, $\overline{Z}_2 = 2.897543763$, $\overline{Z}_3 = 2.168058568$.

10. Will the $N_{\theta i}$, $\overline{R}_{\theta 2}/\overline{R}_{\theta 1}$, $\overline{R}_{\theta 3}/\overline{R}_{\theta 2}$,$E_{\theta 1}$ value and new $\overline{Z}_i$ value respectively into (17.13-2), (17.13 3) type, too: $E_{\theta 2}$ = 0.4504219205, $E_{\theta 3}$= 0.416487862i imaginary (appear).

11. Will $N_{\theta i}$, $\overline{Z}_i$, $E_{\theta i}$ value generation into (15.11), respectively, have four electronic total ionization energy: $\sum \Delta W_{eic}$ = 162.5306605 ev.

Table 17.12 carbon atomic energy level calculation results

$N_{\theta 3}$	$N_{2,3}$	$E_{\theta 1}$	$E_{\theta 2}$	$E_{\theta 3}$	$\sum \Delta W_{eib}$ ev	ΔW_{ei}ev	实验值 ev
	1	0.5781556	0.5558214	0.555821	146.758	1.264	1.264
1.5	1	0.5836997	0.5618043	0.561804	145.338	2.684	2.684
	2	0.5801173	0.5586506	0.604947	143.839	4.183	4.183
	8	0.5837641	0.5629032	0.295976	140.6249309	7.39706906	7.480
2	12	0.5837641	0.5629144	0.435772	139.9865155	8.03548455	8.537
	18	0.5837641	0.5629183	0.553313	139.3881452	8.63385476	8.771
	22	0.5837641	0.5629192	0.092219	139.1157914	8.90620856	
2.5	24	0.5837641	0.5629194	0.220092	139.003486	9.01851404	9.003
	30	0.5837641	0.5629198	0.385714	138.7325458	9.28945424	9.172
3	44	0.5837641	0.5629201	0.069410	138.326576	9.69542398	9.713
	59	0.5837641	0.5629201	0.401584	138.0650824	9.95691758	
4	113	0.5837641	0.5629202	0.047909	137.6206096	10.4013904	
	128	0.5837641	0.5629202	0.280214	137.5535977	10.4684023	
5	225	0.5837641	0.56292018	0.028301	137.3084413	10.7135588	
	240	0.5837641	0.56292018	0.205222	137.2856393	10.7363607	
10^3		0.5837641	0.56292019	1.2×10^{-5}	136.7620136	11.2599864	11.268
Note		This is only the $N_{2,3}$ interval values and experimental value, from the trend can be seen level distribution					

12. Will $N_{\theta i}$、$\overline{Z}_i$、$E_{\theta i}$ value again into (17.13-4), (17.13-1), 7 ~ 11 repeated calculation procedures, and finally to: $\sum \Delta W_{eic}$ = 146.2870955ev is constant.

13. Because of the determination of carbon atoms outer four electronic original total ionization energy of $\sum \Delta W_{ei0}$ = 148.022ev, adjust $E_{\theta 1}$ scope, repeat 7 ~ 12 calculation procedure, finally have to: When $E_{\theta 1}$=0.5731753467, $\sum \Delta W_{ei0}$ =148.022 ev.

Can be seen from the above results that carbon atoms outer first electronic ionization process, step by step with $N_{2,3}$, $N_{\theta 3}$, quantum number increases gradually, the inner electron spin elliptical orbit centrifugal rate will be critical state $E_{\theta 1}$= 0.5731753467 tends to ionic state $E_{\theta 1}$ = 0.583764115 transition. So that $N_{\theta 1}$=$N_{\theta 2}$=1.5, $N_{1,2}$=1, $N_{\theta 3}$=1.5, 2, 2.5, 3, 4, 5, …… 1000，$N_{2,3}$=1, 2, 3, ……∞，$E_{\theta 1}$ in tend to adjust values between 0.5731753467 ~ 0.583764115, repeat 7 to 13 calculation program, we can find out the carbon atoms all level, as shown in the table 17.12. After calculation is also know: $\overline{Z}_i$ only with $N_{2,3}$ values, has nothing to do with the value $N_{\theta 3}$, $E_{\theta 1}$; $\sum \Delta W_{eic}$ Only with $N_{2, 3}$, $E_{\theta 1}$ value, has nothing to do with the value $N_{\theta 3}$; $N_{\theta 3}$ values reflect only the electron spin elliptical orbit centrifugal rate must be $E_{\theta 3} \to 0$.