2n geometric space model of the earth's atmosphere and the periodic table of vertical changes

gang Hu[1], Meiqi hu[2], and jun Hu[3]

[1]Guangzhou College of Technology and Business
[2]Dongli District Hospital
[3]Guangzhou Guangjun Engineering Supervision Co., Ltd

November 23, 2022

Abstract

The earth's atmosphere is divided into many layers. Does this divisional structure contain new laws of physics that we have not yet discovered? Here, we mainly study the structural relationship between the various layers of the earth's atmosphere, hoping to find a new physical law that changes the structure of the earth's atmosphere with the vertical height. This article believes that this new physical law is the "period law of space structure" of the atmosphere. We can use this law to predict and subdivide the causes of the current atmospheric structures and their correspondences and correlations, and may also derive new physical laws for the structure of the macro-planetary level from this. This article uses the method of 2n geometric space construction; corresponding the 2n geometric space structure to the stratified structure of the earth's atmosphere, we found that the earth's atmosphere structure satisfies the principle of 2n geometric space construction, and found that not only the atmosphere has a stratification law, but also It is also found that the inner circle of the earth also has a periodic law that varies with depth. At the same time, a brief periodic structure model of the Earth's atmosphere and a periodic table of structural changes have been summarized and established. This periodic table may become the physical law that unifies the earth's atmospheric structure, and it may also reveal the internal connections between the various spheres. It is also an attempt to propose new laws of physics.

2^n geometric space model of the earth's atmosphere and the periodic table of vertical changes

Hu Gang[1], Hu Meiqi[2], Hu Jun✉

[1] Guangzhou College of Technology and Business, Sanshui Campus, No. 23, Sanhua Road, Fanhu Economic Development Zone, Leping Town, Foshan 528100, Guangdong Province, China.

[2] Dongli District Hospital, Tianjin 300300, China.

✉email: 835877728@qq.com.

Abstract: The earth's atmosphere is divided into many layers. Does this divisional structure contain new laws of physics that we have not yet discovered? Here, we mainly study the structural relationship between the various layers of the earth's atmosphere, hoping to find a new physical law that changes the structure of the earth's atmosphere with the vertical height. This article believes that this new physical law is the "period law of space structure" of the atmosphere. We can use this law to predict and subdivide the causes of the current atmospheric structures and their correspondences and correlations, and may also derive new physical laws for the structure of the macro-planetary level from this. This article uses the method of 2^n geometric space construction; corresponding the 2^n geometric space structure to the stratified structure of the earth's atmosphere, we found that the earth's atmosphere structure satisfies the principle of 2^n geometric space construction, and found that not only the atmosphere has a stratification law, but also It is also found that the inner circle of the earth also has a periodic law that varies with depth. At the same time, a brief periodic structure model of the Earth's atmosphere and a periodic table of structural changes have been summarized and established. This periodic table may become the physical law that unifies the earth's atmospheric structure, and it may also reveal the internal connections between the various spheres. It is also an attempt to propose new laws of physics.

Plain Language Summary: Here, we explain the atmosphere structure of our earth and the inner circle structure of the earth by establishing a new geometric structure, and strive to establish a new physical rule to re-understand our earth or the entire planetary world. By studying the structural relationship between the layers of the earth's atmosphere, we hope to find a new physical law that changes the structure of the earth's atmosphere with vertical height. Our research found that not only the atmosphere layer has a layering law, but also the earth's inner layer also has a periodic law that varies with depth. We have summarized and established a brief periodic structure model of the Earth's atmosphere and a periodic table of structural changes. This table may become a new physical law that unifies the earth's atmospheric structure, and may also reveal the internal connections between the various layers. This is an attempt to unify the structure of the macroscopic atmosphere, and it is also an attempt to propose new physical laws for the structure of the inner and outer layers of the planet.

I. Introduction

What we now know is that the structure of the earth's atmospheric and the structure of the Geosphere are summed up from the actual observation. Why is it such a ring structure? Are these constructs randomly formed? Or follow certain rules. The traditional theory is that the Earth's atmospheric is determined by gravity and the Earth's various 'random' factors, why the Karman line of the Earth is about 100 kilometers, and why the stratosphere is 12-55 km, rather than 22-66 km? High these problems are very easy to explain by random theory, but this randomness blocks our way to really recognize nature.

Traditional theoretical understanding of the atmosphere: the structure of the traditional atmosphere refers to the vertical distribution of meteorological elements, such as air pressure, temperature, atmospheric density and atmospheric composition, according to the system of division recommended by the Executive Committee of the World Meteorological Organization (WMO) in 1962, formally through the International Geodetic and Physical Union (IUGG), that is, the atmosphere is divided into troposphere, stratosphere, mesosphere, thermosphere and fugitive layers according to the characteristics of atmospheric temperature changing vertically with altitude.

A fugitive layer above 800 km above ground is the outermost layer of the atmosphere, also known as the outer layer. The escape layer is also a layer of gradual transition from the atmosphere to interstellar space, which can be regarded as the boundary between the earth's atmosphere and outer space.

There are different opinions about the exosphere layer. Generally speaking, it enters outer space at an altitude of about 80 kilometers or more than 100 kilometers—depending on which standard you are using, there is very little gas here, very little, only slightly more than vacuum.

A new study from the Russian Space Research Institute (SRI) shows that the Earth's atmosphere extends to deep space of 630,000 kilometers, like a giant ellipsoid that surrounds the moon [1].

The study uses data from the solar and heliospheric observatory (SOHO). There are 12 scientific instruments on the (SOHO), including a solar wind anisotropy detector (SWAN) that can track hydrogen signals from the earth and can detect the outer boundaries of the earth's atmosphere with greater accuracy than ever. Researchers at the Russian Space Research Institute Baliukin J.L. analyzed data from SOHO and found that the corona was more than six times larger than previously thought, and our moon actually operated in the Earth's atmosphere!

So is the boundary structure of our atmosphere regular or random? Does our atmosphere have a definite boundary, which is bound by what physical laws?

In this paper, the inner tectonic and the outer atmospheric of the earth are found regularly, which satisfies a periodic tectonic relationship. This article 2^n the geometric structure of the earth's atmosphere (including the structure of the earth's solid circle) [2, 3] and compared with the actual observation to reveal the periodic law of the earth's atmospheric structure.

The accumulation of our cognition of the earth to a certain extent must be summed up by its physical laws to complete the qualitative change and unity of the understanding of the earth structure, and research of this paper is an attempt to this qualitative change and unity.

II. RESULTS

2.0. We use the 2^n here Spatial geometry to study the tectonics of the Earth's atmosphere

The 2n geometric space is a special form of geometric construction [4, 5]the famous Titius-Bode law can be written as a formula [6]**:** $\Phi_0(1+2^n)$ or $2^n\Phi_0$, Earth's inner ring structure is also 2^n Spatial Geometry Rules [2, 3] the tectonic changes of the Earth's atmosphere are also 2^n geometric construction rules! This kind of circle diameter space change rule has the period again, and the division of our Earth's circle is structured to satisfy 2^n geometric principles and construction rules.This is the content to be discussed in this paper.

2.1. The specific application of the 2^n geometric method and the result of mathematical deduction

Deduction of the 2n mathematical law of the structure of the atmosphere **[5,7,8].**

(1) First, we divide the diameter of the earth (6371 km) by 2^8 to get 24.789km, which is called the base diameter a. Use Φ^a to represent the base diameter:

$$\Phi^a \approx 24.88671875 \text{ km, or} \approx 24.8867 \text{ km}$$

(2) Then we divide the diameter of the earth (6371 km) by 2^8+1 to get 24.789km, which is called the base diameter b. Use Φ^b to represent the base diameter:

$$\Phi^b \approx 24.78988327 \text{ km}$$

We use R^y_n to represent the height of the atmosphere from the horizontal plane, and n represents the number of layers (period). The superscript ^{y} of Φ represents the type, $^{y=(a\text{ or }b)}$.

Φ^y Represents the starting quantum unit:

$$\Phi^b= 6371/ (2^8+1) \approx 24.789 \text{ km;}$$

R_n means: the distance to sea level (the range of the circle and the diameter of the dividing line);

${}^ZR^y_n$ means: the distance from the main sequence to the sea level (the range of the circle and the diameter of the dividing line);

$${}^ZR^a_n=2^n\Phi^a \text{ or } {}^ZR^b_n=\Phi^b+2^n\Phi^b = (1+2^n)\,\Phi^b$$

${}^BR^y_n$ means: the distance from the associated main sequence to sea level (the range of the circle and the diameter of the dividing line);

$${}^BR^a_n= 3/2\times2^n\Phi^a \text{or} {}^BR^b_n=\Phi^b+3/2\times2^n\Phi^b=\Phi^b(1+3/2\times2^n).$$

${}^ER^y_n$ (child sequence, referred to as sub-sequence). It is the average value of the 'sum value' of the main sequence and the companion main sequence. ${}^ER^y_n$ is the product of the combination of the main sequence and the companion main sequence to form families. It belongs to the offspring: 'subsequence' to Distance from sea level (diameter of circle layer and dividing line):

$${}^ER^a_n= (2^{n-1}\Phi^a+3/2\times2^{n-1}\Phi^a)/2=5/2\times2^{n-1}\Phi^a \text{ or } {}^ER^b_n= \Phi^b+5/2\times2^{n-1}\Phi^b$$

${}^F\mathbf{R}^y_n$ (anti-starting point circular subsequence), with zRy9i or zRy10i as the starting point, returning to sea level; ${}^F\mathbf{R}^y_n$ has the opposite symmetry Forward of the main sequence. This article only studies the case of n<=9d.

$$\mathbf{{}^FR^a_n= (2^{9-n}\Phi^a+ 3/2\times2^{8-n}\Phi^a)/2 = 2^{8-n}\Phi^a (2+3/2)/2=2^{8-n}\Phi^a 7/4}$$

$$\mathbf{{}^FR^a_0=2^{8-0}\Phi^a 7/4}$$

$$\textbf{or}\quad \mathbf{{}^FR^b_n= (2+2^{9-n}+3/2\times2^{8-n})/2\Phi^b = (1+2^{8-n}+3/2\times2^{7-n})\,\Phi^b}$$

2.2. A general overview of the results of the geometric structure of the atmosphere derived from the 2^n geometric principles.

There are two types of 2^n geometry: One is 2^n Φ without starting circle, n= (0,1,2,3,4,5,6,7,8). Symmetric expansion; the other is $\Phi(1+2^n)$ with starting sphere Symmetrical expansion. Φ is the starting diameter, $\Phi = (\Phi^a$ or $\Phi^b)$. The specific forms of the 2^n expansion of the Φ^a type and the 2^n expansion of the Φ^b type are shown in Figure 1: First of all, we assume that the "starting symmetry point" in the 2^n geometric space is a point on the sea level, as shown in Figure 1 Φ^a; or the "starting sphere and the sea level tangent point" in the 2^n geometric space, shown in Figure 1. In the Φ^b type, then the space structure along the arrow Forward of the symmetry axis other than the symmetry point of the 2^n space geometric structure corresponds to the earth's atmosphere. The space within the symmetry point or the "starting circle" is tangent to the sea level, and the space structure within the tangent corresponds to the physical sphere of the earth.

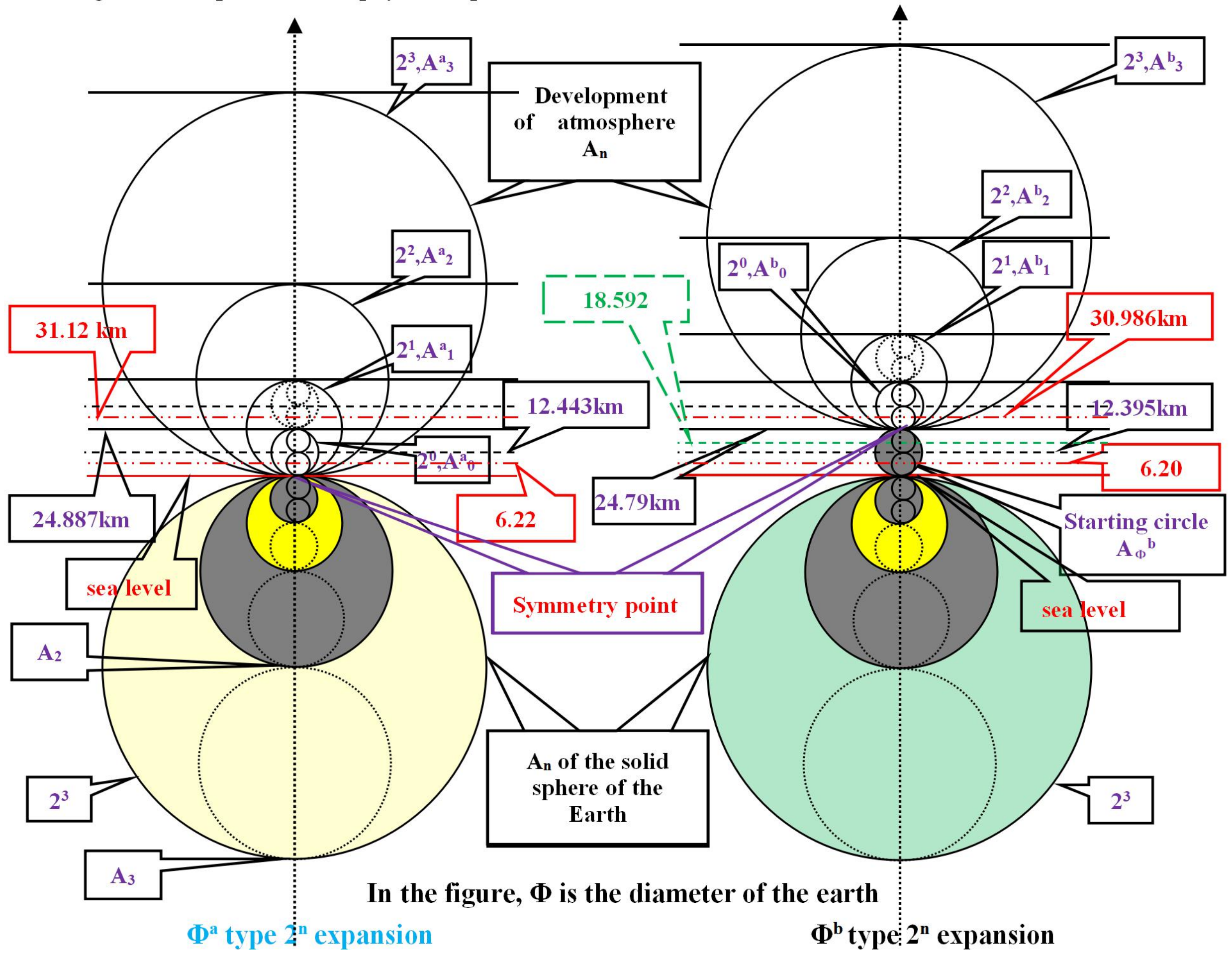


Figure 1| is an enlarged view of the A^{y}_{0}~A^{y}_{3} starting circle of the 2^n geometric space of the earth (see Supplementary Information Figures 5, 9, 11, 12, 13, 14). There are two types of starting circles. Among them, the 2^n expansion of Φ^a is a 2^n symmetrical structure without the 'starting circle' [5]. It can also be considered as: the 'starting circle' is embedded in a symmetrical mirror image, Starting circle' structure. Therefore, the starting point of a-type symmetrical expansion is the symmetrical point, so starting from the symmetrical point, each value of n corresponds to the distance from the starting point to the point of intersection of the arrow of the symmetry axis and the distal end of the starting point $^{Z}R^{a}_{n}$ (Diameter of A^{a}_{N}) equal:

$$^{Z}R^{a}_{n}=2^n\Phi^a$$

the inner and outer interfaces of the ring formed by the trajectory of each n A^{a}_{n} rotating around the center of the earth correspond to a boundary of the atmosphere (see Supplementary Information Figure 7).
the Φ^b type 2^n extension is a 2^n symmetric structure with an independent "starting circle". Therefore, the starting point of the b-type symmetrical expansion is the point tangent to the starting circle, so starting from the symmetrical point, the distance $^{Z}R^{b}_{n}$ from the starting point to the intersection of the arrow Forward of the symmetry axis and A^{b}_{n} corresponding to each value of n is equal to

$$^{Z}R^{b}_{n}=2^n\Phi^b+\Phi^b$$

From the perspective of the starting circle, taking the center of the starting circle as the “axis of demarcation”, the two sides of the symmetry axis indicate the way of symmetry, which is a broken way, half of which is the “negative number object attribute” or the “positive imaginary number object” "Properties", half are "Negative imaginary number object properties" [8] .

2.3. Geometric representation of the result

2.3.1. The 2^n geometrical space of the earth's atmosphere and the geometrical principle diagram of structural space of mathematical logic

Due to the problem of paper size and figure ratio, this paper expands the n= (0/1/2--8) in sections.
Figure 2 is an expanded view of the principle of spatial structure of Φ^b with n= (0,1,2,3,4,5,6,7). From the figure, we can easily see: the structure of the atmosphere derived from the geometry of 2^n at n= (-1,0,1,2), it is basically consistent with the recognized actual observations, and the error is small. After n > 2, the errors of other theoretical values and observations gradually increase, there is controversy. See the periodic table below.

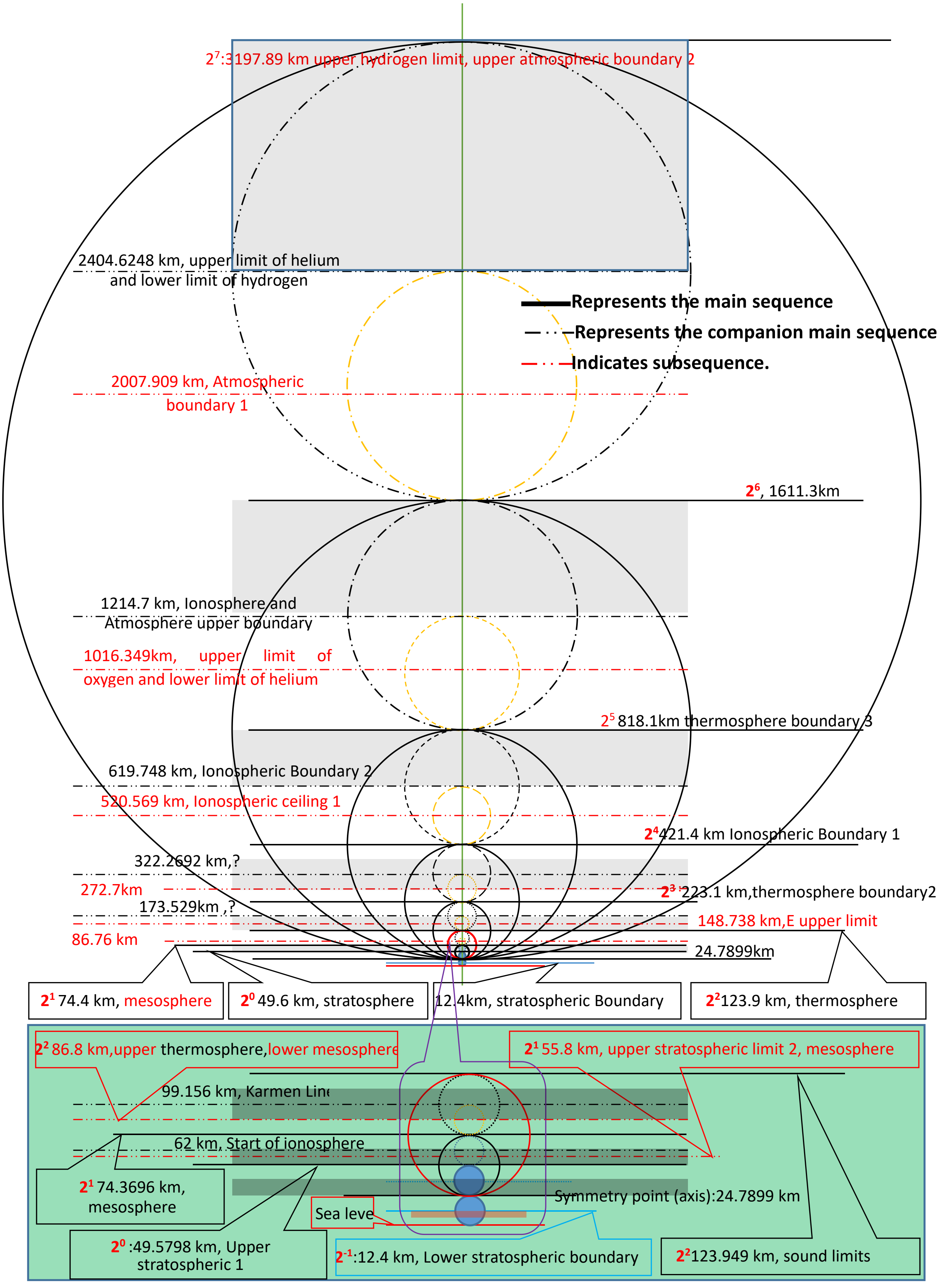


Figure 2| is a geometric 'illustration' of the corresponding n values derived from the 2^n rule and expanded by $^{Z}R^{b}_{n}$, $^{B}R^{b}_{n}$, $^{E}R^{b}_{n}$, $^{F}R^{b}_{n}$ and derived theoretically derived values of 2^0-2^7 atmospheres. The bottom red line represents the sea level, and the blue line represents the stratospheric boundary; the green bottom part is an enlarged view of the red circle.

Starting from sea level, using Φ^b as the starting circle diameter, make a 2^n extension Geometric distribution map.

Figure 3| is an expanded view of the geometric principle of mathematical logic with n= (0,1,2,3,4,5) of Φ^b.

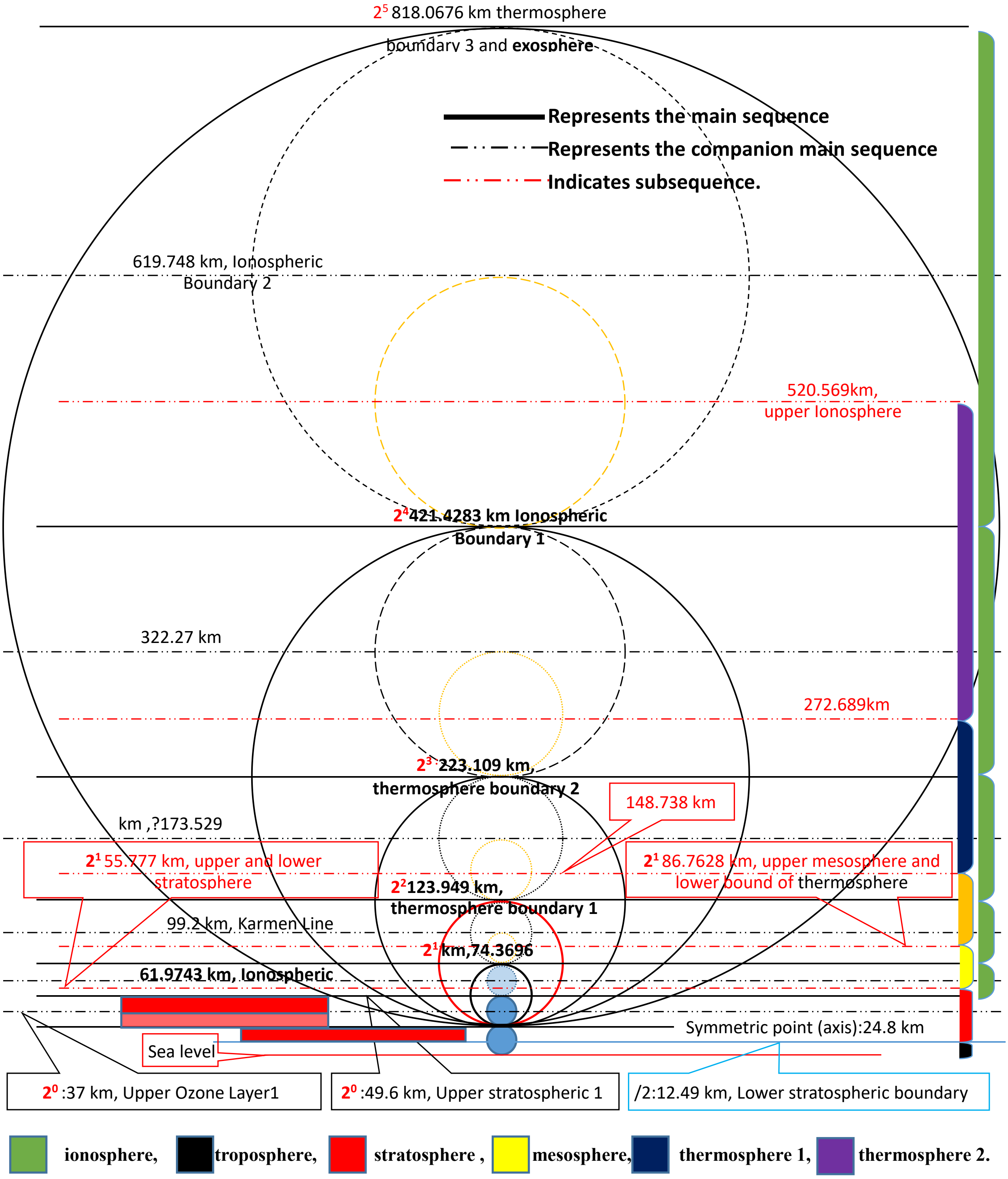


Figure 3| is obvious from the diagram that the stratosphere is formed by two different mechanisms, so the composition of temperature and substance is different. The lower part is the center of the starting circle, the lower part is the troposphere, and the upper part is the isothermal region of the stratosphere. The formation mechanism of the stratosphere 24.789~49.5789km position comes from the attribute of the 0-level symmetric circle system.

In the stratosphere by 2^n Change rule, in 37 km、 24.79 km and down, naturally divided into two levels of inverse temperature layer, isothermal layer, and the error is very small.

Figure 4| n=9$_i$A structural map of the Earth's atmosphere

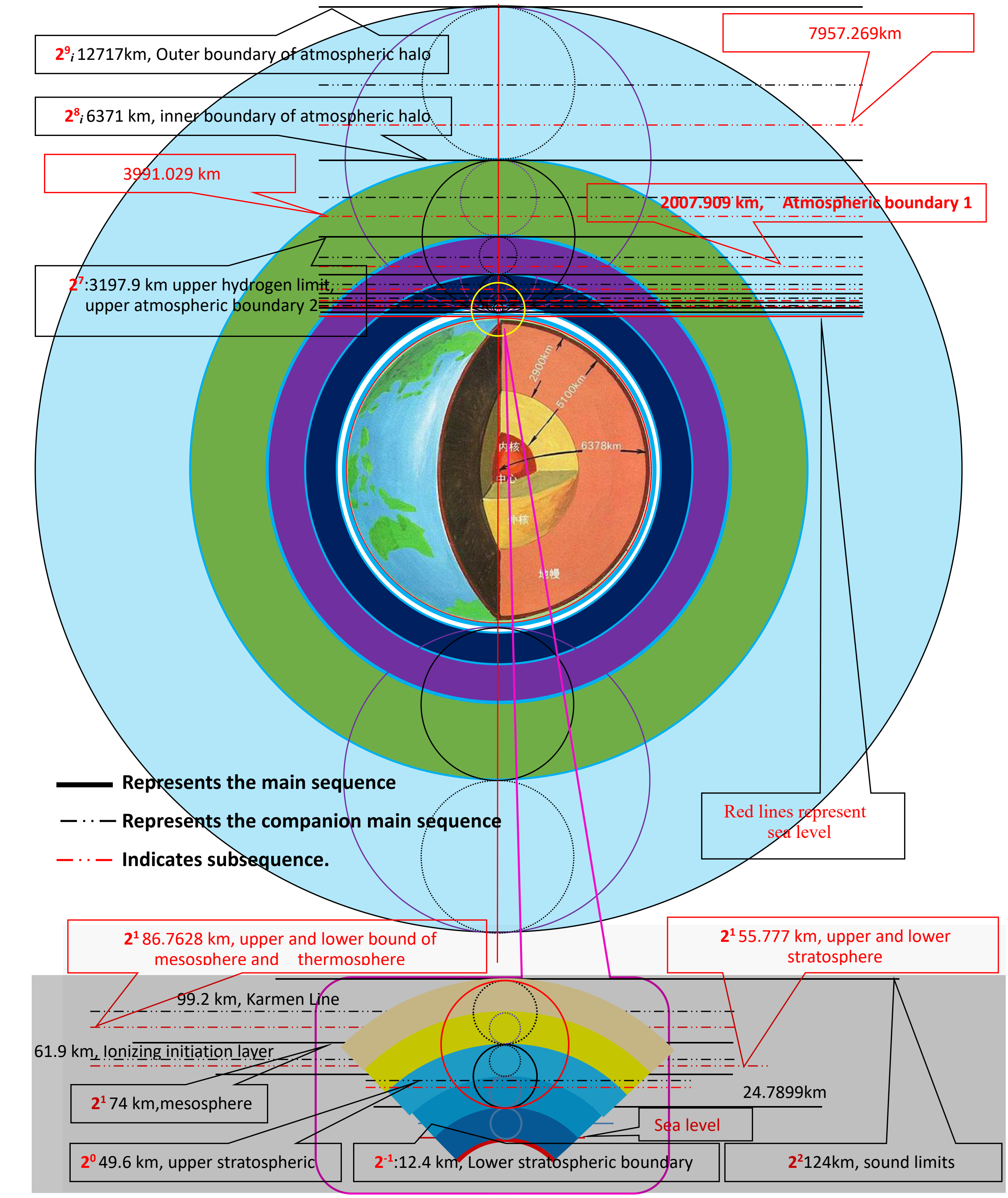


Figure 4 | the theoretically deduced values of the 2^7～2^8～2^9_i circles derived from the 2^n rule. 2^7-2^8 is the real number layer; 2^9_i is the imaginary number layer, which is the virtual end layer of this layer and the start layer of the 'inverse'.

Inner atmosphere (this article refers to the atmosphere from 15989.9 to 3197.9km from sea level as the inner atmosphere).

Outer atmosphere (this article refers to the atmosphere from 3197.9～6371km from sea level as the outer atmosphere).

Atmospheric halo (this article refers to the atmosphere from 6371 to 12717.2 km from sea level as atmospheric halo).

Figure 5 is a schematic diagram of the structure of 2^n n= (0,1,2,3,4,5) Φ^a.

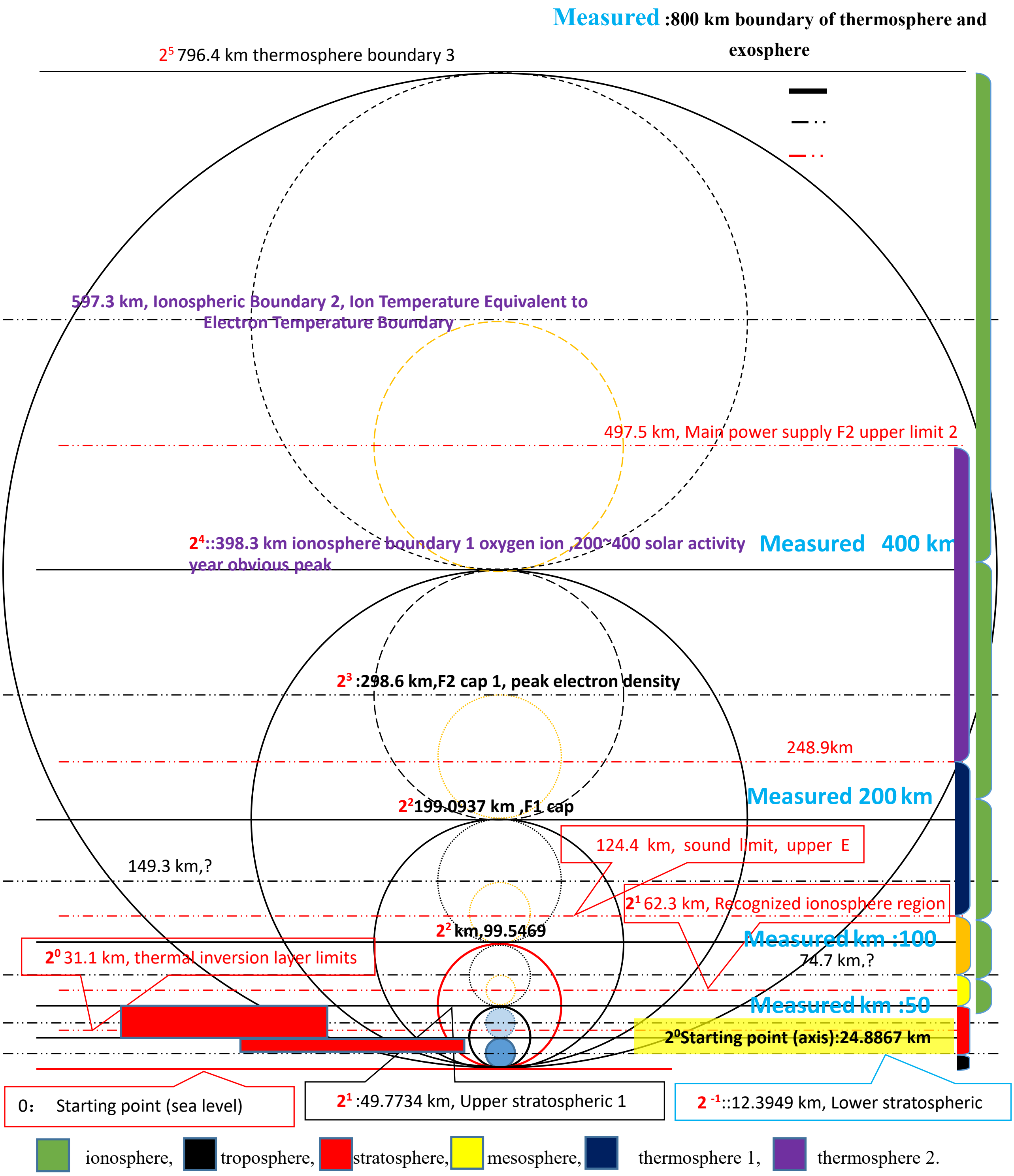


Figure 5 | the diameter of each circle is the sequence of values to a symmetrical circle in 2n geometric space, and the position of each symmetrical point is the peak value of atmospheric structure, or the change position of temperature, density, etc. The error is small.

2.3.2. The Periodic Table of the Earth's Atmosphere Structure and Its Derivation

Table 1 is the corresponding n value expanded by ${}^{Z}R^{b}_{n}$, ${}^{B}R^{b}_{n}$, ${}^{E}R^{b}_{n}$, ${}^{F}R^{b}_{n}$. The shaded part is the imaginary circle layer. When n=9, it enters the imaginary state, so the subscript i of 9_i represents the imaginary state. The performance of the imaginary number state of the thin atmosphere of 9_i at the real number level [8] is the cause of the 'halo'.

The geometric relationships of this table correspond to: figure 1, figure 2, figure 3, figure 4, figure 5, figure 6.

Level n	One, 0	two, 1	three, 2	four, 3	five, 4	six, 5	seven, 6	eight, 7	nine, 8	one ~ nine mirror images 9_i	Remarks
theoretical value $^{Z}R^{b}{}_{n}$	49.58	74.4	123.9	223.1	421.4	818.0	1611.3	3197.9	6371	12717.2	Principal
Measured value	50		120			800	1600	3000	6300-6400		Halo
State	ozone layer 3		acoustic limit			End of escape	10^{-15}	Free world 2 virtual boundaries			
Error	-0.42		+3.9			+18	+11.3	+197.9	71-29		
theoretical value $^{B}R^{b}{}_{n}$	62.0	99.2	173.5	322.3	619.7	1215	2404.6	4784.4	9544	19063.4	Ancillary order
Measured value		100		300		1200	2400				
State	dissociation	Karman				Aurora upper helium lower					
Error	+2	+0.8		+22.3		+15	+4.6				
theoretical value $^{E}R^{b}{}_{n}$	55.8	86.8	148.7	272.7	520.6	1016.4	2008.0	3991.2	7957.6	15890.3	Suborder Boundary
Measured value		85		270	500	1000	2000				
+ error	+0.78	+1.8		+2.7	+20.6	+16.4	8				

Table 2 is **$(^{Z}R^{b}{}_{n})^{-1}+(^{B}R^{b}{}_{n-1})^{-1}$**. Currently, we only observe a thin ionosphere near 22000, and there is no peak in the ionosphere in other positions or the peak error is large. Need further research.

Level n	One, 0_i	two, 1_i	three, 2_i	four, 3_i	five, 4_i	six, 5_i	seven, 6_i	eight, 7_i	nine, 8_i	one ~ nine mirror images -9
theoretical Value $(^{Z}R^{b}{}_{n})^{-1}$	12717.2	6371	3197.9	1611.3	818.0	421.4	223.1	123.9	74.4	49.58
theoretical Value $(^{B}R^{b}{}_{n})^{-1}$	19063.4	9544	4784.4	2404.6	1215	619.7	322.3	173.5	99.2	62.0
theoretical Value $(^{F}R^{b}{}_{n})_i$	11130.7	5577.7	2801.3	1413.0	718.9	371.8	198.3	111.6	68.2	---
Measured value										
State										
Error										

****9 and 9_i there is no difference in arithmetic, but the difference in attributes. Green 0_i ～ 8_i the representation of the imaginary state of the thin atmosphere at the real level.**

Table 3, shows the hierarchical division of the inner structural circle of Φ^b. There is no starting circle for Φ^a, so there is no starting circle Φ^a hierarchical partition table. N= (-4 ~ -8) in the table is for further study.

n	2^{0}	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}	2^{-6}	2^{-7}	2^{-8}
theoretical	**24.789883**	**12.395**	**6.1975**	**3.0978**	**1.55**	**0.775**	**0.387**	**0,194**	**0.097**
	25	**12**	**6**	**2**					
State	**ozone**	**top**	**middle**	**bottom**	**?**	**?**	**?**	**?**	**?**
Error	**0.21**	**0.395**	**0.1975**	**1.0978**					

Table 4 is the corresponding n value expanded by $^{Z}R^{a}{}_{n}$, $^{B}R^{a}{}_{n}$, $^{E}R^{a}{}_{n}$, $^{F}R^{a}{}_{n}$. The shaded part is the imaginary circle

layer. When n=9, it enters the imaginary state, so the subscript '*i*' of 9_i represents the imaginary state **. The performance of the imaginary number state of the thin atmosphere of 9_i at the real number level [8].

The geometric relationships of this table correspond to: Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6. the position of the gray background color is the 'halo state' position deduced in this article.

Level	**One,**	**two,**	**three,**	**four,**	**five,**	**six,**	**seven,**	**eight,**	**nine,**	**one ~ nine mirror images**	
n	0	1	2	3	4	5	6	7	8	9_i	**Remarks**
theoretical value ${}^{Z}R^{a}_{n}$	24.9	49.8	99.5	199.1	398.2	796.4	1592.8	3185.5	6371	12742	Main Sequence
Measured value		50	100			800	1600	3000	6300-6400		
	Ozone 1	Ozone 3	Karman				10^{-15}				
Error	+0.1	0.2	+0.5			-3.6	-7.2	+185.5	71-29		
theoretical value ${}^{B}R^{a}_{n}$	37.3	74.7	149.3	298.6	597.3	1194.6	2389.1	4778.3	9556.5	19113	Connexions
Measured value				300		1200	2400				
State	ozone 2			$1000C^0$		Upper boundary					
Error +2.3				-1.4		- 5. 4	-10.9				
theoretical value ${}^{E}R^{a}_{n}$	31.1	62.3	124.4	248.9	497.8	995.5	1991	3981.9	7963.8	- 15927.5	Suborder, Boundary
Measured value		60	120	240	500	1000	2000				
State											
Error		+2. 3	+4. 4	+8.9	-2. 2	-4. 5	-9				

Table 5 is $({}^{Z}R^{a}_{n})^{-1}$ **and** $({}^{B}R^{a}_{n-1})^{-1}$ At present, we only observe that there is a thin ionosphere near 22000, and no peak or peak error in the ionosphere is very large at other locations. This is because the ionosphere is the product of the "imaginary state".

Level	**One,**	**two,**	**three,**	**four,**	**five,**	**six,**	**seven,**	**eight,**	**nine,**	**one ~ nine mirror images**
n	0_i	1_i	2_i	3_i	4_i	5_i	6_i	7_i	8_i	-9
theoretical Value $({}^{F}R^{a}_{n})_i$	11149.3	5574.7	**2787.3**	**1393.7**	**696.9**	**348.4**	**174.2**	**87.1**	**43.6**	**?**
Measured value										
State										
Error										
n	9_i	8	7	6	5	4	3	2	1	0

2.3.3. Specific form of a comprehensive table for the periodic table of the structure of the Earth's atmosphere

The periodic table is divided into logical deduction periodic table and spatial construction periodic table. The difference is $({}^{F}R^{b}_{n})_i$- $({}^{F}R^{a}_{n}$ **the Forward of expansion and contraction are different.**

Sequence State	the starting circle has four states [2,6]			Real negative, $^{Z}R^{b}_{n} > ^{Z}R^{a}_{n}$								Halo, $^{Z}R^{b}_{n} < ^{Z}R^{a}_{n}$	
Division	Surface atmosphere			Inner atmosphere	Outer atmosphere								Internal halo
Traditional division	Troposphere			Stratospheric 12~50-55	Intermediate layer	thermosphere (80-85) ~ 800						Halo	
									Fugitive layer (outer layer)800-(2000-3000)				theoretical
R^{y}_{n} n	±3 $\pm 3_i$	±2 $\pm 2_i$	±1 $\pm 1_i$	0	1	2	3	4	5	6	7	8_i	9_i
$^{Z}R^{a}_{n}$- $^{Z}R^{b}_{n}$	0-3.1	0-6.2	0-12.4	25-50	50-74	99.5-124	.1199-223	.2398-421	796-818	1593-1611	3186-3197	6371	12717-12742
Measured	2	6	12	25-50	50	100-120	200		800	1600	3000	6300-6400	I 6371-12742
State				Ozone 2	Ozone 3	voice limits				$*10^{-15}$	the outside	Real-Follow	Virtual halo
Error	-1.1	-0.2	0.4	0.1～0.2	0.2～?	0.5～4	0.9~23		-3.6-18	-7.2～11.3	186～197	71~28	
Companion sequence													
$^{B}R^{a}_{n}$ - $^{B}R^{b}_{n}$				37-62	74.7-99	149-173.5	298.6-322	597-619.7	1195-1215	2389-2405	4778-4784	9557-9544	19113-19063
Measured				35-60	100		300		1200	2400			
State				Ozone, dissociation	Karmen		$1000C^{0}$		Aurora ceiling	Lower limit of main helium			
Error				+2.3～2	0.8		-1.4～23		-5.4～15	-10.9～4.6			
Sequence													
$^{E}R^{a}_{n}$-$^{E}R^{b}_{n}$				31-55.8	62-87	124-148.7	249-273	497-521	999.5-1016	1991-2008	3982-3991	7964-7598	15928-15890
Measured				30～55	55～85	120~150	240~270	500	1000	2000			
State				Inversion layer	mesosphere	Sound Limit	Density 10^{-7}-10^{-10}	Lower limit of thermosphere	Lower limit of oxygen	Outside Density			
Error				1～0.8	7～2	4～1.3	9 ~3	-3～21	-0.5～16	-9～8			
Anti-initial subsequence													
	Halo layer												Troposphere
	±3 $\pm 3_i$	±2 $\pm 2_i$	±1 $\pm 1_i$	0_i	1_i	2_i	3_i	4_i	5_i	6_i	7_i	8_i	9
$(^{F}R^{b}_{n})_i$-$(^{F}R^{a}_{n})_i$	0 - 2.7	0 - 5.4	0 -10.9	46.5-21.77	68.2-43.6	111.6-87.1	198.3-174.2	371.8-348.4	718.9-696.9	1413. 0-1394	2801-2787	5578-5575	11131-11149
Measured	2	6	12							Es-			---
State				Ionization zone (68.2,46.5)-11131. Spatial sequence atmosphere structure								Real-Follow Boundary	
	44448-44597	22236-22298	11131-11149	5578-5575	2801-2787	1413. 0-1394	718.9-696.9	371.8-348.4	198.3-174.2	111.6-87.1	68.2-43.6	46.5-21.77	0-10.89
		22000								Es-			
State		Ionizing zone		Real-Follow Boundary	Ionization zone 11131-(68.2,46.5). Logical sequence of atmosphere stratification								

Figure 6| Periodic table of the vertical structure of the atmosphere.

III. Discussion

3.0. From Table 1-4, we can see that the 2^n geometric circle structure of the earth derived from the variation of 2^n geometric space is basically consistent with the actual observation, with varying errors; That are derived from the change of the periodic table, you can see that we change the spheres of the earth is regular, the construction of our planet is not random, more don't like we here on earth to heat the iron ball or other object after cooling, the earth is 2^n such large enough systemic sphere geometry space, different from that of our small objects on the ground structure rule, also do not meet these small structure and the change rule of the object, just like the micro structure change rule does not meet our macro objects and change rule. And 2^n a space geometry is different from traditional physical theories from space symmetrical geometry structure, to study the spatial structure theory, using the 2^n space structure derived method, derived layer structure periodic table, can be a very good correspond to actual observations, hope to further discover new laws of physics.

We recognize that the structure of the earth's atmosphere begins with exploration, so we begin to recognize that the atmosphere is to sum up and recognize these results, and these results end up with a' atmosphere model'. Our exploration of the atmosphere already knows the vertical structure of a system, but what is the origin of this structure? According to the detection, summary, re-detection, re-summary of the way has not worked. So we try to sum up the structural causes of this circle with various existing physical theories. What about inside the earth? We do the same to get a model of the inner circle of the earth. At this time, whether the structure of the inner circle of the earth is related to the structure of the outer atmosphere is in front of us; of course, the idea that the outer atmosphere is the external atmosphere, and the idea that the outer and inner 'no' are related is dominant; the idea that the structure of the inner and outer circles of the earth is necessarily related is considered random for a period of time. So why do we think so? Because we don't know the origin of the inner and outer layers of the earth and the 2^n physical laws, so we can only mistakenly apply other physical laws to the understanding of the earth circle, resulting in one-sided and superficial cognition.

Our findings are that from the Earth's surface up, the atmosphere extends high enough to reach thousands of kilometres above. According to the satellite data, the density of the earth's atmosphere reaches one microparticle per cubic centimeter at a height of 2000-3000 km, which is very close to the density of interstellar space. So that 2000-3000 km of altitude can be roughly regarded as the upper boundary of the earth's atmosphere. These results are only superficial and rough. When moving from the ground to the outside, how should the earth's atmosphere be divided? we don't have to detect whether or not we can predict theoretically. These show that the existing model of atmospheric circle needs to be perfected, that is, our cognitive accumulation reaches a certain amount, which requires qualitative change in order to truly recognize these results. The 2^n geometric space is our theory of abstract cognition of space and physical geometry. Applying this theory to the structure of the earth's circle allows us to re-establish a new tectonic model of the earth's atmosphere —— the periodic table of the earth's atmosphere.

3.1. Comparison of actual observation results and model derivation results

3.1.1. Comparison of tropospheric ceiling results

We know that the troposphere is at the bottom of the atmosphere. Its thickness varies with latitude and season. The equator is 17~18 km, thick two poles 8~9 km, the average thickness of the troposphere we observed was 0-(11~13) km, from sea level Mean ≈ 12 km. As we can see from figure 1, Evidently, from the starting point to the A_{Φ^b} or A^a_0 the center of the circle is very close to 12 km; and when there is no starting circle, the starting symmetry point is A^a_0 at the beginning above, as Φ^a in figure 1. Figure Φ^b: a starting circle A with an imaginary state A_{Φ^b}, obviously A_{Φ^b} or A^a_0 and the radius is : $\Phi^b/2$ or Φ^a from the starting point of symmetry (sea level) to the A_{Φ^b} or A^a_0 center of the circle forms the upper tropospheric boundary when A_{Φ^b} or

$A^a{}_0$ the trajectory of the whole rigid rotation around the center of the earth is the average boundary position of the tropopause.

$\Phi^b = 24.7898832/2^1 \approx 12.3949494$ km or $\Phi^a \approx 24.88\ 67/2 \approx 12.44335$km

the upper limit of troposphere derived from the theory is 12.39494~12.44335km, which is 0.39494~0.8867km more than the accepted average of 12. This error may be the systematic error of measurement or the imperfect error of theory. We need to deepen 2^n the study of geometric space construction theory.

3.1.2. Comparison of stratospheric ranges

① At the bottom layer below 25 km, temperatures remain almost constant with the increase of vertical height, known as the isothermal layer (ozone layer 1).

We know $A_\Phi{}^b$ diameter and $A^a{}_0$ diameter: $\Phi^a/2^0$ and $\Phi^b \approx 25$ km, is close to the height of the same temperature layer, and the theoretical derivation is the same as the measured error :0.1133~0.21km.

And that suggests that the troposphere is by $A_\Phi{}^b$ and $A^a{}_0$the common superposition is a mirror symmetry relationship from sea level to tropopause (12 km) and tropopause to stratosphere 1(12~25 km). The b starting circle is also $A_\Phi{}^b$ or a n= level of $A^a{}_1$Because of the different attributes or Forwards of the opposite and the opposite, the formation of the breaking symmetry leads to the different movement modes of the troposphere and the stratosphere. The lowest ozone layer is called the ozone layer 1 position corresponding to the space position range of the stratosphere. It is not difficult to see from the above analysis that the origin of ozone layer 1 is the same as the starting circle and the A circle$^a{}_1$n-1 attributes of mirror space of the inner layer are closely related (the reason is further studied).

② From Figure 1 we know A: $A_\Phi{}^b$ or $A^a{}_0$ is the distance of the intersection point in the Forward of the arrow in the same Forward on the circle $A_\Phi{}^b$ or $A^a{}_0$ the diameter is exactly the upper limit of stratospheric 1 and ozone layer 1. $2^0\times\Phi^b+\Phi^b$ composition $A^b{}_0$A space system, the point on $A^b{}_0$ furthest from the starting point is the position of the main sequence ${}^ZR^b{}_0$; $2^1\times\Phi^a$ composition $A^a{}_1$ space system, furthest from the starting point $A^a{}_1$ Point is the main order ${}^ZR^a{}_1$ the position of. The distance between the two systems from the starting symmetry point ${}^ZR^y{}_n$ Separate, ${}^ZR^b{}_0 = 49.579{}^ZR^a{}_1 = 49.7734$ km; the values of both sequences are very close to 50 km, while 50 km is exactly the stratospheric top 1(50 km). As can be seen from figures 1 and 4, the $A^b{}_0$ or $A^a{}_1$ is the atmospheric structure from sea level to stratospheric top 1 is composed of two parts, one is sea level to the top of stratospheric 1(25 km), the other is from stratospheric 1 to stratospheric top (50 km).

This suggests that the upper limit of 50 km in the stratosphere is by $A^b{}_0$ and $A^a{}_1$ common superposition composition, $A^b{}_0$ and $A^a{}_1$ diameter determines the distribution range of the highest space in the stratosphere (the upper limit of 55 km, is determined by other factors).

From the analysis of ① and ②, $A_\Phi{}^b$ or $A^a{}_0$ and $A^b{}_0$ or $A^a{}_1$ the spatial structure and distribution range of, the formation of the troposphere, the emergence of stratospheric 1, the isothermal layer is also the product of b type n=0 and a type n= 1. ' Tropospheric + stratosphere1 '0~25 km and 25~50 km 'stratosphere2' and 'inverse stratosphere' are the associations of broken mirror symmetry (see Figs .1 and 4 and 8).

Internal stratospheric division and comparison of observations

See Figure 7, let's first look at Figure 7 a, Φ^a is this a type structure with no starting circle. The cyan circle near the 'symmetry point' in Figure 7 a is when n=0, 2^0 formed ${}^aA_0$ Space. $A^a{}_0$ the interior is divided into two parts from the center of the circle, the lower part forms the troposphere, and the upper part forms the stratosphere 1(12~25 km). The yellow circle is 2^1Space, use $A^a{}_1$(a) to indicate. $A^1{}_1$the inner part is divided into two parts from the center of the circle, the lower part forms the troposphere and stratosphere 1(0~25 km, and the upper yellowish green circle is the part ${}^aA_0$ the mirror image forms the second part of the stratosphere (25~50 km), subdivided into stratosphere 2.

See Figure 7, let's look at Figure 7 b, Φ^b is this b type a structure with a starting circle. Figure 7 b Black is the starting circle space, with $A_\Phi{}^b$ to indicate. $A_\Phi{}^b$ the interior is divided into two parts from the center of the circle, the lower part forms the troposphere, and the upper part forms the stratosphere 1(12~25 km). The cyan circle is 2^0 space, using $A^b{}_0$ to indicate. $A^b{}_0$ from the center of the inner division into the upper and lower parts of the troposphere and stratosphere 1, formation $A^b{}_1$ yellow part, part $A^b{}_1$ from the center of the circle is divided into two parts, the lower part is $A^b{}_0$ the upper part forms the second part of the stratosphere (25~50 km).

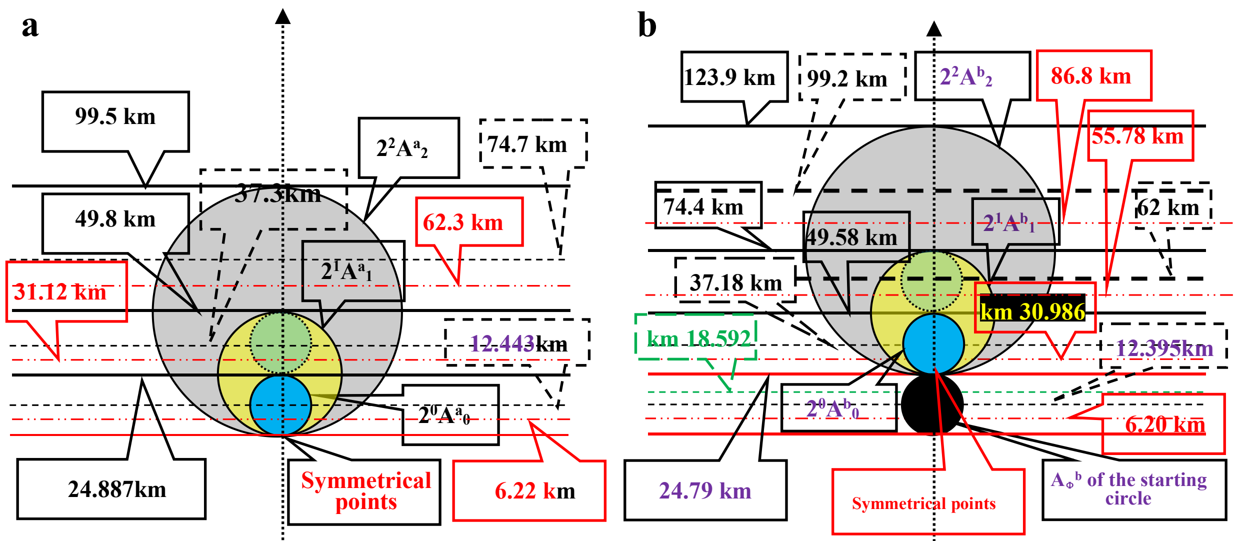


Figure 7| Φ^a is 'a' type, no starting circle. Φ^b is b type a structure with a starting circle. The red line represents the position of sea level or initial symmetry point; black represents the position of 'subsequence space'; black discontinuous line represents the position of subsequence, red dot denotes the position of 'subsequence space'; cyan discontinuous line represents the reverse starting circle suborder. The black circle represents the starting circle and the cyan circle represents the A_0 at n=0 space position and size; yellow circle indicates A_1 at n=1 the blue-yellow (yellowish green) circle represents the mirror image of the cyan circle; the gray circle represents the A_2 at n=2. The figure is the vertical distance from sea level to each sequence. Arrows indicate the symmetric Forward.

Clearly $A^b{}_1$ yellow-green circle inside is $A^b{}_0$ the mirror image.

Our observations for stratospheric 2 are different, and the summarized results, 25~ (50 or 55 km) are inversion layers some consider that 12~30 km are stratospheric and 25~36 are stratospheric ~ (50 or 55) are stratospheric. Its main dividing lines are 30,36,50,55. We are 2^n spatial geometry principles, which can be easily found in Tables 1 and 4.

According to Tables 1 and 4 and 8, Figure 1, Figure 2, Figure 3, Figure 4, we subdivide stratospheric 2 into three parts

(1) The first sub-part T_1, formed by the boundary of the associated main sequence, can be divided into 25~37km (T'_1), and 37~50km (T''_1).

Using the principle of 2^n space, we naturally conclude that the atmosphere at 37 km has a limit, which is an error of 1km from the actual observations. At the same time, the 'associated sequence' also obtained an upper limit value of 50 km, which is consistent with the observed value. The source of the error at the 37 km position needs to be further studied.

(2) The second sub-part ${}^aT_2$ is juxtaposed, formed by the boundary of the a-type subsequence ${}^ER^a{}_1$ when n=1, and can be divided into 25~31.12 km (${}^aT'_2$), 31.12~37.3 km (${}^aT''_2$), 37.3~ 49.8km (${}^aT'''_2$).

We use the 2^n space principle and according to the a-type subsequence, we naturally get the value of 31.12 km. It is predicted that there is a limit in the atmosphere at 31.12, which is an error of 1km from the actual observation result of 30 km. Then there should be a distinction between 31.12~37.3 km ($^aT''_2$). At the same time, the a-type sub-sequence $^ER^a_1$ also has an upper limit value of 49.8 km, which indicates that this 49.8 km ($^aT'''_2$) position should have one Boundary; this value is consistent with the observed value of the 50, and the error is consistent.

(3) The second sub-part $^bT_2$ in parallel is formed by the boundary of the b-type subsequence $^ER^b_0$ when n=0, and can be divided into 25~30.98 km ($^bT'_2$), 30.98~, 37.18 km ($^bT''_2$), 30.98 ~49.58 km ($^bT'''_2$).

We use the 2^n space principle and according to the b-type subsequence, we naturally get the value of 30.98 km. It is predicted that there is a limit in the atmosphere at 30.98, which is an error of 1km from the actual observation result of 30 km. At the same time, the b-type 'subsequence' also obtained an upper limit value of 49.58 km, which is the same as the observed value, and the error is consistent (error 0.42 km). The sources of these errors may be systematic observation errors, and at the same time, they may also be the need for further in-depth research due to imperfect theory.

It is not difficult to see that the error of 30 (observed value), 30.98, and 31.12 are about 1km. When we measure these boundaries, these (1), (2), and (3), the three sub-parts, may exist at the same time and overlap each other, or there may be only one factor. Therefore, the observation results are always different at different times and locations. Only when we sum up different locations in different periods according to the existence of the same time can we hit the result of (1) (2) (3). At the same time, the error of 36 (observed value), 37.18, 37.3, is about 1.3 km, which indicates that the 2^n theory is imperfect or the observation is imperfect, which requires in-depth study.

3.1.3. Comparison of results on the scope of the middle tier

The mesosphere we observe is a layer above the stratospheric top (50~85 km) about (80,85 km) above the ground.

This middle layer 50~85 km, also has the statement (50~55 km) and (80)85) interval, why these two intervals?

Figure 1, Figure 2, Figure 3, Figure 4, Figure 7, in a type 2^n space, when n=2, A^a_2A gray circle a figure 7, we can easily see: there are layers across. From the $A^a_1 \rightarrow A^a_2$ at the same time $^ZR^a_1 \rightarrow {}^ZR^a_2$, at this point, the observed atmosphere also enters the thermal layer from the stratosphere across the mesosphere. From figure 7 a, then we derive three intervals of different attribute types:

(1) $^ZR^a_1 \rightarrow {}^ZR^a_2$the value is (49.8~99.5)≈(50~100) and the boundary position of Karman line is deduced. Between two main orders, from $A^a_1 \rightarrow A^a_2$A after level rise$^a_1$the space range is from 50→100 km, so it includes and goes beyond the middle layer range (85km) of the observation summary ,15km. Deep into the thermal layer also it can be considered that these 15km are excessive areas of the thermal layer.

(2) $^ZR^a_1 \rightarrow {}^BR^a_1$ the value is (49.8~74.7)≈(50~75). Is formed between a master order and a companion master order, from$^ZR^a_1 \rightarrow {}^BR^a_1$A A of rising levels$^a_1$the spatial range is from 50→75km, so it is included in the middle layer of observation summary.

(3) $^ZR^a_1 \rightarrow {}^ER^a_2$ the value is (49.8~62.3) ≈ (50~62) derived 62 km with boundaries (close to the measured' ionization initiation region'60 km).

Figure 1, Figure 2, Figure 3, Figure 4, figure 7, in b type 2^n space, when n=1, A^b_1 are the yellow circles a figure 7, we can easily see: there are layers across. From the $A^b_0 \rightarrow A^b_1$at the same time $^ZR^b_0 \rightarrow {}^ZR^b_1$. At this point, the observed atmosphere also enters the thermal layer from the stratosphere across the mesosphere. From figure 7 b, then we derive three intervals of different attribute types:

① $^ZR^b_0 \rightarrow {}^ZR^b_1$ the value is (49.8~74.4) ≈ (50~74). A slave between two main orders $A^b_0 \rightarrow A^b_1$ after level rise A^{b}_{1} mirror space, space range from 50→74 km, so in the middle layer range (85 km)

② The values of $^{Z}R^{a}_{0}\rightarrow{}^{B}R^{a}_{0}$ are (49.8~62.3)≈(50~62) km. It is deduced that 62 km has a boundary (close to the measured ionization starting area 60 km), which is composed of a main sequence and a companion main sequence. $^{Z}R^{b}_{0}\rightarrow{}^{B}R^{b}_{0}$ is in the mirror space position of A^{a}_{0} after the level ascends, and the space range is from 50→62 km, so it is included in the mesosphere of observation summary.

③ $^{Z}R^{a}_{0}\rightarrow{}^{E}R^{a}_{1}$ the value is (49.8~55.8) ≈ (50~56).

3.1.4. Comparison of results on the range of thermal layers

The thermal layer is a layer above the top of the intermediate layer (80~85 km) about 500 to 800 km above the earth's surface. Thermal layer we observe and summarize is also an interval (500~800 km).

We refer to Fig .1, Fig .2, Fig .3, Fig .4, Fig .7, and it may be seen that the b space, when n=2, A^{b}_{2} is the gray circle in Figure 7a, we can easily see: there are layers across. From the $A^{b}_{1}\rightarrow A^{b}_{2}$ at the same time $^{Z}R^{b}_{1}\rightarrow{}^{Z}R^{b}_{2}$, at this point, the observed atmosphere also enters the thermal layer from the stratosphere across the mesosphere. We can see from the comparison of a type and b type in figure 7 that two gray A^{a}_{2} and A^{b}_{2} the differences in the diameter of geometric space is small (99.4-99.12 km), but their spatial position difference is 24.7899 km, which leads to the formation of the same n values of the spatial boundaries are not the same or similar positions, so the boundary interval is produced. The space of A^{b}_{2} still covers the middle layer and the hot layer. Therefore, we say that the middle layer and the hot layer have the same factors. Then we derive three different attribute types from Figure 8b:

①The value of $^{Z}R^{b}_{1}\rightarrow{}^{Z}R^{b}_{2}$ is (74.4~123.9) ≈ (74~124) km, and the boundary position of 124km line is deduced (which is considered to be the acoustic wave limit by observation). Is the mirror space of A^{b}_{1} formed between two main sequences after ascending from A^{b}_{1} to A^{b}_{2}, and the space range is from 74 to 124km, so the limit of the middle layer (85km) is within the mirror space A^{-1b}_{1} of A^{b}_{1}.

② The value of $^{Z}R^{a}_{1}\rightarrow{}^{B}R^{b}_{1}$ is (74.4~99.2) ≈ (74.4~99) km, and it is deduced that there is a boundary at 99 km (close to the measured Karman line 100 km), so we can naturally derive value of Karman line with an error of about 0.8 km.

③ The value of $^{Z}R^{a}_{1}\rightarrow{}^{E}R^{a}_{2}$ is (74.4~86.8) ≈ (74.4~86.8) km, and it is deduced that there is a boundary at 86.8 km (close to the measured upper limit of the middle layer 85 km), so we can naturally infer the upper limit of the middle layer with an error of 1.8 km.

Summary: We can see from the derivation of the layers that the upper limit of the stratosphere and the upper limit of the middle layer are both derived from the position of the subsequence, that is to say, the main sequence is the source of the boundary between the upper limit of the stratosphere and the middle layer.

We can see from figure 7 that when n=2, both a-type and b-type enter the thermal space. From Table 1, we can get: b-type 2^{n} geometric space, in the 85~800 km space, there are 99.2 (Karman line), 123.9 (sound limit), 148.7 (?), 173.5 (?), 223.1 (?), 272.7 (density 10-10), 323.3 (?), 421.4 (?), 520.6 (close to the upper limit of the thermosphere), 619.7 (close to the ionosphere's ion temperature is equivalent to the dividing line of the electron temperature), and 818 (close to the escape layer). The position (?) in the thermosphere space derived from the theory is the demarcation position derived from the theory in this paper, which needs to be confirmed by observation.

From Table 1, we can get: a-type 2^{n} geometric space, in the space of the 99.5~800 km, there are 99.5 (Karman line), 124.4 (sound limit), 199.1 (?), 248.9 (close to 240 position density 10^{-7}), 298.6 (at a position of 300 km, temperature $1000C^{0}$), 398.2 (?), 497.8 (close to the upper limit of the 500 km thermal layer), 597.3 (?), 796.4 (close to the escape layer). There are (?) unknown location boundaries in the thermosphere space derived from the theory, which are deduced in this paper and need to be confirmed by observation.

3.1.5.Comparison of the results of the range of the exosphere

Generally considered 800 km or more as exosphere, according to 1200 km auroral appearance is considered to be an upper limit of the atmosphere; Under 80~1000 km nitrogen, oxygen, became oxygen - oriented around 1000 km, and more than 3,000 km up, Think into interstellar space. But, uh, the sounding rocket still finds a thin atmosphere at 3,000 kilometers, the upper boundary of the atmosphere may extend to about 6400 kilometers from the ground. On the basis of these findings, we divide the escape layer into 800~1000 km and 800 km ,1200 (1000 or 1200) ~3000 km, 3000~6400 km.

We refer to figure 2, figure 4, table 1, table 4 to conclude: a type, from 796.4~6400 km and b type from 818 to 6400 km, spanning n=5~8 geometric space period. Therefore, this paper thinks that the atmospheric vertical structure model summarized by traditional observations are too rough.

We summarize tables 1 and 4 to conclude that the upper limit of the thermal layer (796.4-818); (995.5-1016.4) is close to the lower limit of oxygen as the main component; (1194.6-1215) close to auroral ceiling; (1592.8-1611.3) close to density 10^{-15} Location; (1991-2008?), (3185.5-3197.9); (3981.9-3991.2? This paper considers this as boundary 2 of the escape layer (2); (4778.3-4784.4? This paper considers this to be boundary 3 of the escape layer). From (3185.5-3197.9) to 6371 is 2^n the symmetrical earth entity observed in geometric space is the part of positive imaginary state, and the earth atmosphere is the manifestation of the real state contained in the positive system. At n = 9, enter 2^n other states of geometric space need further study.

Due to coronal (geocorona) and extra space over 2^n geometric space n < = 8 range, this has not been studied and discussed.

We'll take 2^n geometric space structure is applied to the structural study of the earth's atmosphere, and the periodic table of atmospheric structure is derived, which is of great significance to the creation of new physical theory. In addition to the study of the tectonics of the Earth's circle ,2^n the method of geometric space construction may also be applied and extended to the study of planetary systems outside the earth, which may provide a new physical theory for the structure of the planetary circle and the dynamics of the orbit [10] the Earth's atmosphere plays a vital role in our lives. The theoretical causes of the inner layers of the Earth we live in and the details and future changes in the structure of the Earth's rings will affect everyone. The understanding and cognition of the structure and movement of these unknown natural factors will provide a theoretical cognitive Forward for us to predict and avoid and change these natural factors that are not conducive to human survival. The periodic table model of the Earth's atmosphere profoundly shows that the structure of our atmosphere is divided between layers 2^n geometric space construction is controlled by such new physical laws, rather than random construction when causality is unknown. After understanding the period of the spatial model of the structure of the earth's atmospheric circle and the source of the structural theory, we can have a new breakthrough understanding of the macro earth, so that we can have a new and higher level of cognition of nature, and provide us with new theoretical tools to further understand nature and transform nature. 2^n the further study of geometric space and periodic table of the earth's atmospheric circle can connect and correspond the structure of the inner and outer layers of the earth, which may provide a new theoretical basis for the new method of predicting various natural disasters more accurately.

IV. CONCLUSIONS

The structure of the vertical circle of the Earth's atmosphere is the result of our exploration with various detectors. We are used to studying the structure of the inner and outer circles of the earth by means of exploration, summary, and then exploration, and summary. We are also used to studying and analyzing these results by physical laws on the ground and analyzing the internal relations of these results by using existing theories. In this way, we have preliminarily established the structural models of the Earth's atmosphere, but what physical laws govern and control these models? We used to use the physical laws we summed up on the ground to explain the model, which led us to probe one step further, leaving us confused and unknowable about the future results of the probe.

Here we go 2^n the theory of geometric space is physicalized, and this new method of geometric space physics is used to study and analyze the vertical structure of the atmosphere. The 2^n geometric space theory is used to deduce the structure of atmospheric circle, and the periodic table of earth atmosphere structure is established.

The periodic table reflects the internal relationship between the structure of the atmospheric circle and the inner circle of the earth. Make its earth internal composition and external atmospheric circle form a complete unified system. This may provide a new Forward different from the traditional theory for further study or prediction of earthquakes, and may also provide a new theoretical basis for further study of the relationship between seismic clouds and earthquakes.

We use 2^n the theoretical method of physicalization of geometric space is based on the diameter of the earth 2^n geometric space, with sea level as 2^n the starting symmetry point of the geometric space.It not only reflects the diameter of the earth and the corresponding relationship between the internal structure of the earth and the external atmosphere, but also can be applied to the study of the structure of the 'internal' circle of the earth.

The 2^n application of theoretical methods not only allows us to further study the internal correlation between the various 'layers' of the earth's atmosphere, but also may be further applied to the study of the structural derivation of the inner and outer rings of other planets. This allows us not only to observe and detect unknown planets in confusion, but also to test them in the future.

The periodic table of the Earth's atmosphere will show that the circles and boundaries of the atmosphere are not arbitrary and random, and are regular, and that the boundaries of each circle can be followed regularly. The 2^n geometric space theory to calculate and derive.

These theories speculate that although the error consistent with the actual observation is very small, more accurate theory is needed to reduce the error, which needs to be further improved and developed in our future research.

Methods

1.0 Construction of "screen space" field in 3^N plane (plane six level space) [4, 5, 7]

1. Suppose there is a circle A_0 with a diameter of Φ_0 on the plane (we call A_0 the 'starting circle'), and the radius $R_0=\Phi_0/2$, then there can only be six non-interfering tangents to A_0 in this plane, and two tangent circles, (that is, six arranged outside A_0 and tangent to A_0 at the same time, then the two adjacent circles must be tangent). Here we call 'tangency' as 'plane tangent symmetry', and the six tangent circles of A_0 are called 'symmetry circles'. These six symmetry circles have two tangent circles, the inside is A_0, and the outside is called A_1. Then the radius of A_1 is $R_1=3\Phi_0/2=3/2\Phi_0$, similarly to derive the radius of A_2 is $R_2=3R_1$, the radius of A_N is $R_N=3R_{n-1}$,

$$R_N=3^N/2\Phi_0,\ N=(0,1,2,\text{-----})$$

The N is called the change expansion period, the Forward of the expansion from the starting circle to the external 0→N is called the forward of forward, and the Forward from the 0→N, N is called the "reverse return" Forward, A_0 the internal contraction is 0→ -N is called the contraction Forward.

This symmetrical expansion of circular space is called the plane screen space field (like a screen provides space for other space objects to live in).

2. A circle tangent to the center of the six 'symmetric circles' can only have one, which is called the center circle: C_N, N= (1,2,3, ---), so the C_N radius is recorded as ${}_cR_N$,when N =0, the symmetric circle does not exist, so C_0 nor does it exist.

$${}_cR_N=2R_0\times3^{N-1}=\Phi_0\times3^{N-1},\ N=(1,2,3,\ \text{----}6)$$

the center circle of this expanded 'screen space field' is called the plane 'center screen 'space field (because it is in the center of the six symmetrical circles).

3. And so we know that this kind of screen space has a starting center (A_0 is the starting circle, A_0 the center of the circle is the starting center point). The whole plane screen space rotates around the starting center point, and each cycle N the corresponding trajectory of the 'symmetric circle' to form N' ring'.

Each ring is the living place of the planetary ring structure

4. The 'flat screen space field' rotates around a straight line on the plane and passing through the center of the circle of A_0, and the trajectory of the rotation forms a sphere. Compose space of the sphere. This straight line is the autobiographical axis of the sphere. At this time, the circle of each cycle rotates to form the corresponding sphere circle layer, which is called sphere circle layer screen space

5. Assuming that all symmetric circles rotate rigidly around the starting center, every 360^0 once, all symmetric circles return to their respective starting positions. We assume that the positions of the six symmetric circles are six equal in size, each rotating position symmetrically expands once. When rotating six positions, each symmetric circle returns to the starting position and the symmetric expansion ends. Complete an expansion cycle. And so this symmetry expands until N=6 to complete an expansion cycle.

6. A period of expansion to form a maximum sphere radius is R_6, $R_6=3^6R_0=729R_0=364.5\Phi_0$。${}_CR_6=2\times3^{6-1}R_0=486R_0=234\Phi_0$。As a result, N < = 6 in a cycle, we call such a six-cycle cycle a dimension. Each dimension may or may not continue to expand. We call this non-expansion of the dimension boundary is limited, is the source of limited screen space, but also the source of screen space boundaries.

above 1.2,3,4,5.6 refer to supplementary information' Figure 1'

1.1.0. The composition of the 2^n plane projection "space field"

1. A point p on the circumference of a starting circle A_0, then the circle B_x that passes through this point p and A_0 inscribed can have $x(x\to\infty)$, and similarly, the circle circumscribes A_0 through this point There can also be $x(x\to\infty)$, an inscribed B_x can only correspond to a circumscribed B_x' with the same diameter. This

paper refers to this one-to-one correspondence of internal and external tangency as ‘complete mirror symmetry’. In the process of mirror symmetry, if there is a change, the relative ‘body and mirror’ are not exactly the same, which is called ‘broken’ symmetry, or broken for short.

2. When the diameter of this mirror-symmetric inscribed 'symmetry circle' B_n (denoted as Φ_n) is expanded by 2^n, we call it 2^n geometric expansion, and the space generated by this correspondence is called 2^n geometric space (see Supplementary Information) Figure 2, Figure 3, Figure 4).

3. When A_0 is inscribed and expanded by 2^n, there are three situations:

(1) No 2^n mirror image expansion can be observed, only 2^n expansion of the body or mirror image in the expansion space can be observed;

(2) The 2^n expansion space of the body and the mirror image can be observed at the same time;

(3) The expansion of the body and the mirror image is not observed (remains unchanged).

4. Suppose that the plane 2^n expansion exists in the spherical screen space of 3^N expansion, and the starting circle is A_0, then the expansion mode of 3^N is 3^N times of the radius of the starting circle, and the expansion of 2^n is 2^n times of the diameter of the starting circle; when 3^6 reaches the limit, the 2^n expansion is limited in the screen space of $R_6 = 3^6R_0 = 364.5\ \Phi_0$; when 2^8, $\Phi\ 8 = 256\ \Phi\ 0$, so $\Phi\ 8 < R6$ is in the screen space. When n = 9, $\Phi\ 9 = 512\ \Phi\ 0$, then $(R6 = 3^6R_0 = 729R_0 = 364.5\ \Phi_0) > (\Phi_9 = 512R_0) > ({}_CR_6 = 2 \times 3^{6-1}R_0 = 486R_0)$, because $(\Phi_9 = 512\ \Phi_0) > ({}_CR_6 = 2 \times 3^{6-1}R_0 = 486R_0)$ exceeds ${}_CR_6$, we think that when n = 9, A_9 is abnormal (the attribute of A_9 is different from $A_0 \sim A_8$)

5. When n=10, because Φ_{10}=1024R_0> 729R_0 => R_6, Φ_{10} exceeds the screen space range and ‘A_{10}’ does not exist. Because A_{10} does not exist, there is no external mirror symmetry circle in A_9, which makes the structure of A_9 abnormal (it becomes an imaginary state). Therefore, we can only normally observe the existence of 2^n geometric space of A_0~A_8 whose diameter is Φ_0~Φ_8.

6. Suppose plane $2^n$the starting circle diameter of space is the same plane 3^nIf the starting circle in space is equal in diameter and 2^n planes are perpendicular, then space field versus 3^n the space field' is the vertical expansion space field' 2^n the space field is perpendicular to $3^n$the trajectory of the intersection on the plane constitutes 2^n the interface of the sphere (corresponding to the earth's atmosphere, the origin of the interface of the atmosphere).

7. The starting circle of the expanded expansion Forward (in the opposite Forward) has a synchronous opposite expansion process in the opposite Forward (in the reverse) of the symmetric expansion. The space generated by this process is defined as a cis image relative to the 'direct', and is named as a cis' reverse'(see supplementary figure 5). In this paper, we define the image relation of the synchronous change as the entanglement relation' entanglement'

8. Inside each symmetrical circle A_n, there are two inner circles with equal diameters, one is A_{n-1} and the other is a mirror image of A_{n-1}.

9. The symmetry space of ontology and mirror image is called full mirror symmetry space. Noumenon and mirror images produce partial loss of symmetric information in the process of symmetry, which leads to incomplete similarity, which is called "broken symmetry ", which is referred to as broken.

10. One 2^n extended geometric space must contain a symmetrical reverse mirror space. When the system rotates with the center of the 'symmetrical point' or the center of the starting circle, the trajectory forms the circular ring layer system described in this paper (see Fig .6, Fig .7 of supplementary information).

11. When the circular circle system in 10' rotates around a straight line through the center of the circular system, the trajectory it forms is a three-dimensional sphere, which is formed because the parent body of the rotation is a plane circle structure. The structure of the three-dimensional sphere is also a sphere structure. (See figure 8 for supplementary information)

1.1.1. The 2^n contraction regression

When there is expansion, there is contraction, and when there is an outward direction, there is an inward direction. We refer to the outward direction and expansion symmetry, which is called ‘expansion’; we call the process of shrinking from the outside to the center starting point in the opposite direction relative to the expansion symmetry as shrinkage inverse regression

1.2.1. Sequence division of 2^n space and association between sequences

The 2^n geometric space is a geometric space composed of two forms of starting circle and non-starting circle superimposed on a space position and symmetrically expanded with imaginary numbers in 2^n space. This space is preliminarily divided into four categories according to the order of symmetrical n value: main sequence, associated main sequence, subsequence and anti-starting circle subsequence (first-level division)

1. Spatial definition of main order: at 2^n during spatial expansion, the process of expansion is one expansion in sequence, that is, A first generation$_1$and then produce A_2, A_3----→A_8~A_{9i}**, A_{9i} the ‘*i*’ represents the A_9** attributes are imaginary states (non-physical structures, gaseous, field ,' dark')[8] every A_n homoscopic A'_n (A) of the A_{n+1} the space distance from the center point to the starting symmetry point is called the main sequence $^ZR^y$ superscript ^{Z} Represents the main order, superscript ^{y} Represents the type of starting circle, y=(a or b),(see figure 10 of the supplementary information).

2. Spatial definition of the companion main sequence: The main sequence of A_n is produced, and the internal A_{n-1} must be accompanied by the generation of a relatively mirror-like 'anti' space. This kind of main sequence's ontology also produces a mirrored sequence name It is an accompanying process (also an entanglement process). Two A_{n-2} levels of internal space mirroring each other are also produced inside the resulting companion space. We call the distance between the tangent point of the two mirror images of A_{n-1} (also the center of A_n) and the starting point as the companion main sequence distance, referred to as the companion main sequence; denoted as $^BR^y$, the superscript ^{B} represents the main sequence, and ^{y} represents The type of starting circle, y= (a or b type). The mirror space of A_{n-1} in the real state A_n is based on the center of A_n as the symmetrical point, and the symmetry direction is relative to A_{n-1}, and A'_{n-1} is on the side of the arrow in the expansion direction (line j). The mirror space $^iA^{-1}_{n-1}$ of iAn-1 in the 'virtual state ^iA_n' is the center of ^iA_n as the symmetry point, and the symmetry direction is relative to $^iA_{n-1}$, $^iA^{-1}_{n-1}$ is in the expansion direction (straight line ^{i}j). Arrow one side. (See Figure 11 in the Supplementary Information).

3. The spatial definition of the subsequence: the interior of the space between the main sequence and the companion main sequence. A pair of mirrored spaces of A_{n-2} will be produced. Compared with A_{n-1}, this space has one more level of periodic change to the inside. At the same time, it is also the average sum of the spatial distances between the main sequence and the companion main sequence, so it is also It is produced by the main sequence and the companion main sequence, called the sub-sequence of the main sequence and the companion main sequence, referred to as the sub-sequence. The distance from the “sub-sequence” to the starting point is indicated by the red font $^ER^y$, and the superscript “^{E}” indicates the sub-sequence. Order, superscript y means type, y= (a or b)

4. Definition of 4.'reverse starting circle': Hypothesis 2^n during the A_8 of space geometry A_8 exists outsideA_8 the mirror space starts with its tangent point and the tangent point of the body, and takes the virtual mirror image as the starting circle to the interior of the body with 2^n expansion or 2^n the form shrinks, and the 'starting circle' of the virtual mirror is called the reverse starting circle. The suborder of the imaginary number state produced by

this mirror expansion is the reverse starting circle suborder.

the Spatial Definition of the Reverse Starting Circle Suborder: From the space we find each of these ${}^{B}R_{n}^{y}$ By the way ${}^{Z}R^{y}_{n+1}$ there is no division of suborder or main order between the spaces, which are relatively uniform, and we find that, ${}^{B}R_{n}^{y}$ by the way ${}^{Z}R_{n+1}^{y}$ it seems similar ${}^{B}R_{n}^{y}$ by the way ${}^{Z}R_{n}^{y}$ the main order ${}^{B}R_{n}^{y}$ and ${}^{Z}R_{n+1}^{y}$ can be combined to produce a similar ${}^{E}R^{y}$ because of the suborder ${}^{B}R_{n}^{y}$ and ${}^{Z}R_{n+1}^{y}$ there are 'level generation difference' and time generation difference, so ${}^{B}R_{n}^{y}$ and ${}^{Z}R_{n+1}^{y}$ there is no principal order, but there is a contraction regression from the reverse starting circle (starting point) to the starting point, which produces the inverse starting point principal order, and the inverse starting circle regression are imaginary numbers state. Therefore, the main order produced by the reverse starting circle is also a virtual number state (not expanded and discussed in detail in this paper). We assume temporarily intuitively that the reverse starting circle suborder is a virtual number state ${}^{B}R_{n}^{y}$ same ${}^{Z}R_{n+1}^{y}$ because there is a generation difference between them, this combination is a combination of imaginary state, so the main order and suborder of the reverse starting circle are both virtual attribute states.

In this way, in the geometric space of 2^n space, there are four different types of spatial positions, the main sequence, the companion main sequence, the subsequence, and the anti-starting circle subsequence. These four spatial positions are the boundaries of the spaces with different attributes. When the 2^n space of such a plane rotates at the center of the starting circle or the starting point of symmetry, the rotation trajectory of an n level of An will form a plane ring, which is called a plane ring layer. (See Figure 7 in the Supplementary Information).
When this plane circle rotates with a straight line passing through the circle center of the circle as its rotation axis, it constitutes a three-dimensional spherical circle structure space (see Supplementary Information Figure 8).

1.2.2. The difference between the 'inverse regression' system and the anti-starting circle imaginary number state

"Reverse regression" is a return to the original path in the forward and reverse direction. There is no reverse starting circle in the reverse direction. The forward and reverse directions are carried out in sequence. The anti-starting circle is a 2^n geometric space expansion change with the imaginary state of the starting circle, which can be superimposed with the real state's 'positive and negative' space, and it can occur synchronously with the real state's 'positive and negative' or not. We assume that the 'inverse regression' has an imaginary number state starting circle. At this time, this 'inverse regression' system becomes an 'imaginary number anti-starting circle system'.

1.3. The derivation of the distance from each sequence to the initial symmetry and the relationship between each sequence

(1) First, if the diameter of A_0: 'Φ_0^y' is known, then we can intuitively derive it from the mathematical relationship of the main sequence ${}^{Z}R^{y}_{n}$, the definition of the main sequence and the 2^n geometric space (Supplementary Information Figure 10),

$${}^{Z}R^{a}_{n}=2^n\Phi_0^a \text{ or } {}^{Z}R^{b}_{n}=\Phi_0^b+2^n\Phi_0^b = (1+2^n)\,\Phi_0^{\mathbf{b}}$$

If we don't know Φ_0^y , it can measure A_8 diameter Φ_8 and then, with Φ_8 divided by 2^8 received $\Phi_8/2^8$ called a type foundation diameter. Use Φ^a represents base diameter:

$$\Phi^a = \Phi_8/2^8$$

(2) Then we use Φ_8 divided by $2^8\Phi+1_8/(2^8+1)$, called b type foundation diameter. Use Φ^b represents base diameter:

$$\Phi^b=\Phi_8/\,(2^8+1)$$

And we use R^y_n to represent the height position of each interface of the circle formed by each 'sequence' rotation track from the horizontal plane, and n represents the number of layers and the period of change. The superscript y= (a or b) of Φ^y represents the type.

Φ^y represents the starting quantum unit (the starting unit of a system):

$$\Phi^b \text{ or } \Phi^a;$$

R_n represents the distance from each sequence position to sea level (the circle range and the diameter of the circle boundary itself).

(3) Thus ${}^{Z}R^{y}_{n}$ the distance from the main sequence to the sea level (the range of the circle and the diameter of the dividing line); we derive directly from (1) the distance

$${}^{Z}R^{a}_{n}=2^n\Phi^a \text{ or } {}^{Z}R^{b}_{n}=\Phi^b+2^n\Phi^b = (1+2^n)\,\boldsymbol{\Phi^b}$$

(4) ${}^{B}R^{y}_{n}$ the distance from the associated principal order to the sea level (circle range and diameter of the dividing line), we follow the associated principal order ${}^{B}R^{y}_{n}$ definition and 2^n of the mathematical relationship and associated principal order geometric space (supplementary data figure 11) can be intuitively derived;

$${}^{B}R^{a}_{n}= 3/2\times2^n\Phi^a \text{or} {}^{B}R^{b}_{n}=\Phi^b+3/2\times2^n\Phi^b=\Phi^b(1+3/2\times2^n).$$

(5) ${}^{E}R^{y}_{n}$ (descendant sequence, abbreviated as suborder representation) is the average value of the sum value of the main sequence and the associated main sequence.It is the product of the combination of the main sequence and the associated main sequence to form a family. It belongs to the offspring: the distance from the "sub sequence" to the sea level (the circle range and the diameter of the dividing line). We can directly deduce it from the mathematical relationship of the sub sequence ${}^{E}R^{y}_{n}$, the definition of the sub sequence and the 2n geometric space (supplementary information Fig. 12);

$${}^{E}R^{a}_{n}= (2^{n-1}\Phi^a+3/2\times2^{n-1}\boldsymbol{\Phi^a})\boldsymbol{/2=5/2\times2^{n-1}}\Phi^a\textbf{or}\,{}^{E}R^{b}_{n}=\boldsymbol{\Phi^b}+5/2\times2^{n-1}\boldsymbol{\Phi^b}$$

(6) ${}^{F}R^{y}_{n}$ (reverse starting point principal order) to ${}^{z}R^{y}_{10i}$ or as the starting circle, return to sea level; ${}^{F}R^{y}_{n}$ opposite to the symmetry Forward of the main order.

we define the space from the inverse starting order and 2^nSpace observation, we find each of these ${}^{B}R_n^{y}$ by the way ${}^{Z}R_{n+1}^{y}$ there is no division of suborder or main order between the spaces, which are relatively uniform, and we find that,${}^{B}R_n^{y}$ by the way ${}^{Z}R_{n+1}^{y}$ it seems similar ${}^{B}R_n^{y}$ by the way ${}^{Z}R_n^{y}$ the main order ${}^{B}R_n^{y}$ and ${}^{Z}R_{n+1}^{y}$ and can combine to produce a similar ${}^{E}R^{y}$ because of the suborder ${}^{B}R_n^{y}$ and ${}^{Z}R_{n+1}^{y}$ there are 'level generation difference' and time generation difference, so ${}^{B}R_n^{y}$ and ${}^{Z}R^{y}_{n+1}$ there is no principal order, but there is a reverse starting circle (starting point), the contraction of the reverse starting circle regresses to the expansion of the starting point, producing the inverse starting point (reverse starting circle) principal order, and this inverse starting circle regression is a imaginary number state (the starting circle of the regression is a virtual number state), so the primary order produced by the starting circle is also a virtual number state (not expanded and discussed in detail in this paper). Let's temporarily assume that the reverse starting circle suborder is a virtual number state ${}^{B}R^{y}_{n}$ same ${}^{Z}R^{y}_{n+1}$ the resulting space relative to other sequences is' imaginary number state'. So we'll go from' ${}^{Z}R^{y}_{n}$ and${}^{B}R^{y}_{n-1}$ the mathematical relationship and the definition of the reverse starting circle suborder and 2^n geometric space (supplementary data figure 13) can be intuitively derived

$$\boldsymbol{{}^{F}R^{a}_{n}= (2^{9-n}\Phi^a+} 3/2\times2^{8-n}\boldsymbol{\Phi^a)/2 = 2^{8-n}\,\Phi^a\,(2+3/2)/2=2^{8-n}\Phi^a 7/4}$$

$$\textbf{or } \boldsymbol{{}^{F}R^{b}_{n}= (2+2^{9-n}+3/2\times2^{8-n})/2\Phi^b= (1+2^{8-n}+3/2\times2^{7-n})\,\Phi^b}$$

In this way, in geometric space of the 2^n space, there are four different types of spatial positions, the main sequence, the associated main sequence, the main sequence, and the inverse initial circular subsequence (imaginary number state). These four spatial positions are spaces of different attributes the demarcation. When the 2^n space of such a plane structure rotates at the center of the starting circle or the starting point of symmetry, then the rotation trajectory of an n-level A_n will form a "planar ring" corresponding to the n-period level. It is called the plane circle layer. (See Figure 7 in the Supplementary Information).

When this plane circle rotates with a line passing through the circle center of the circle as its rotation axis, it constitutes a three-dimensional spherical circle structure space (see Supplementary Information figure 8).

1.3.1 The 3^n same as 2^n the difference

The 3^n symmetric geometric space takes the center of the starting circle as the center point, and the other symmetric points change with the symmetry expansion (the space distance changes relative to the starting center point). The 3^n in the process of symmetry space expansion, the symmetry point is moving. The 3^n expansion is based on the radius of the starting circle.

The 2^n symmetric geometric space takes a point on the circumference of the starting circle as the symmetric point, and the spatial position of the symmetric point remains unchanged relative to the center of the other symmetric circles during all symmetric expansion.The 2^n in the process of symmetry space expansion, the symmetry point is always a (starting symmetry point). The 2^n expansion is the expansion in the base unit of the diameter of the starting circle.

1.4 Attribute issues

This article believes that: object and space are both attributes, the state of an object, is it solid, liquid, gas, plasma, field, or dark ('dark matter', 'dark space', etc.), and finally to the empty state.

This article believes that space is an extreme of the state of matter of an object, and at the same time an object (state of matter) is also an extreme of space (empty state); therefore, object and space are two opposite attributes that are extremes of each other. Objects have four attributes [8]: 1, real state (solid, liquid), 2, negative state (negative object: gaseous state, halo state, dust state, etc.), 3, positive and imaginary state (field state) 4, negative Imaginary number state (dark state, similar to dark matter).

This article only assumes that the Earth's sphere has only three states: gas (atmosphere), solid (earth entity) and liquid (hydrosphere), and other states are not considered.

Supplementary information

'3^n and 2^n geometric data in geometric space

Our world is changeable, geometric space is diverse, so the space that constitutes our real world is our existing geometric space form? Is there any other space that we do not perceive as more harmonious and perfect, as in our real world, and our world evolves according to this form of spatial movement change? A special type of plane to multidimensional 3^n and the 2^n space of expansion or contraction. This space has both real and imaginary forms, which are complex space and multidimensional space [4, 11 ~ 13] . This special space may be the structure and evolution form and rules of our real world space and objects.

1.0 '3^n' the Concrete Form of Geometric Space[4, 5 , 7, 9 ~ 13]

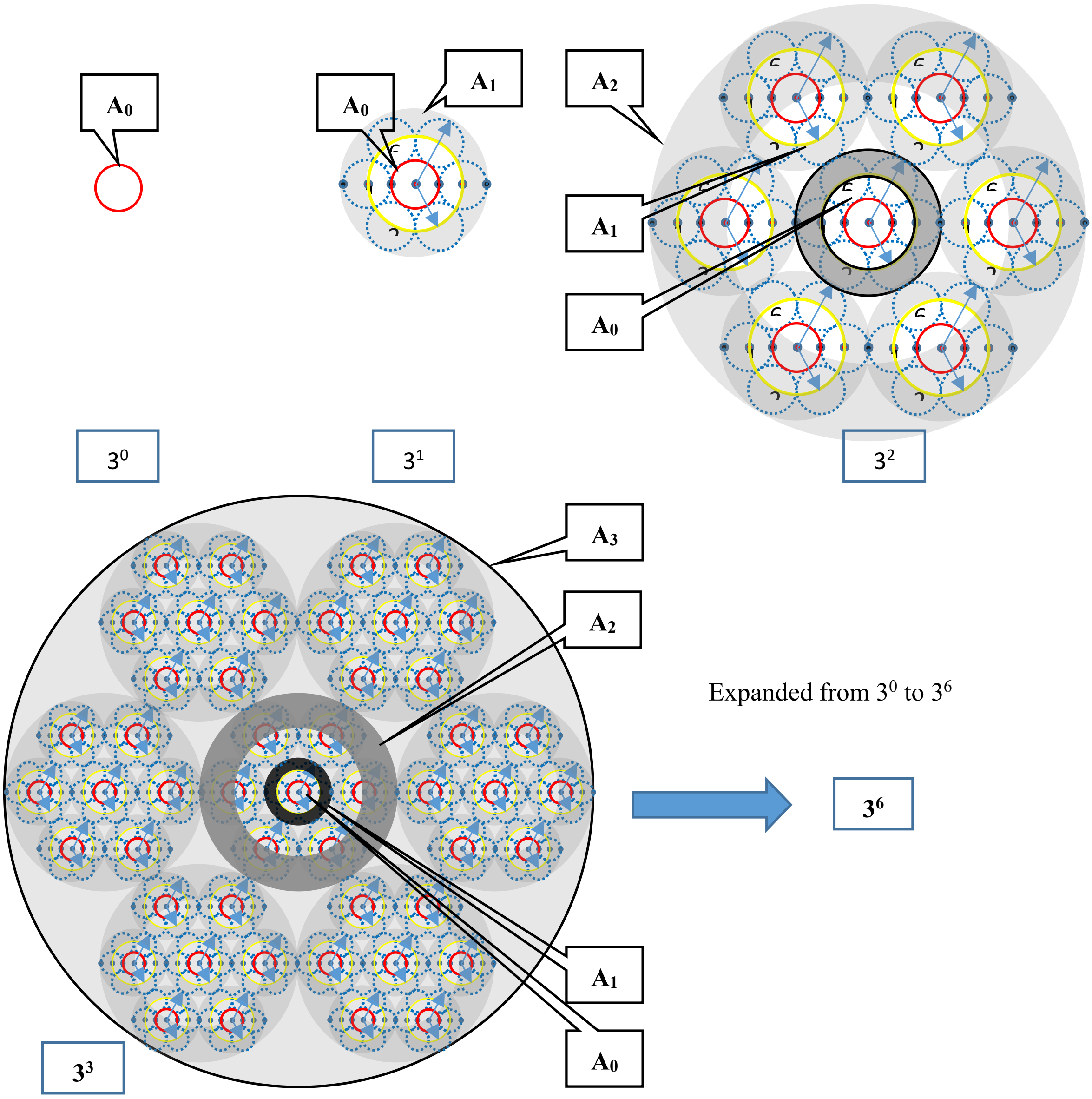


Figure 1 | The '3^n' geometric space is a space surrounded by six cotangent circles with a starting circle A_0 and its diameter in a plane. This space rotates to form A_1, which is then formed again with A_1 as the starting circle A_2, A_3, A_4, A_5, A_6 are formed in sequence, and it ends at A_6, forming a cycle. Such a spatial location is 'six-level screen space'. Each space of the size of the starting circle A_0 is one pixel of the screen space. (A starting circle representing different levels and different periods, A_0 is called the basic starting circle, n = (0, 1, ---- 6).

1.1. The '2^n' Concrete Form of Geometric Space

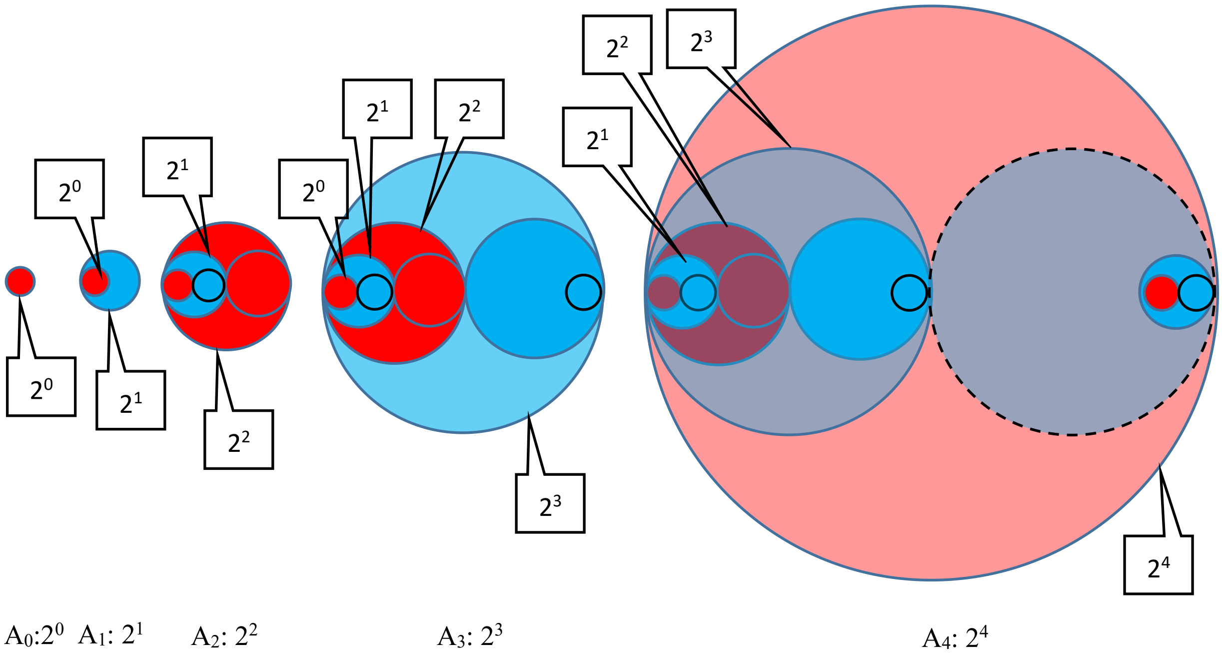


Figure 2 | 2^n symmetrical geometric structure diagram with n = (0~4). Starting from the starting circle A_0, every time it expands symmetrically, the diameter expands twice.

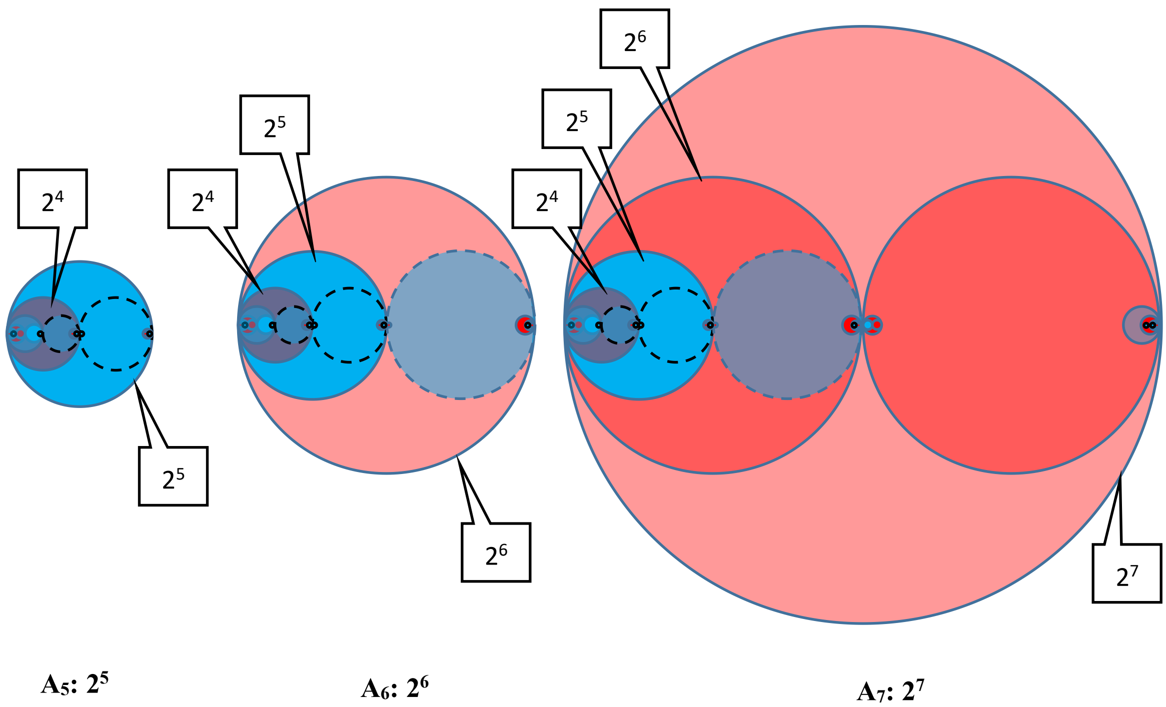
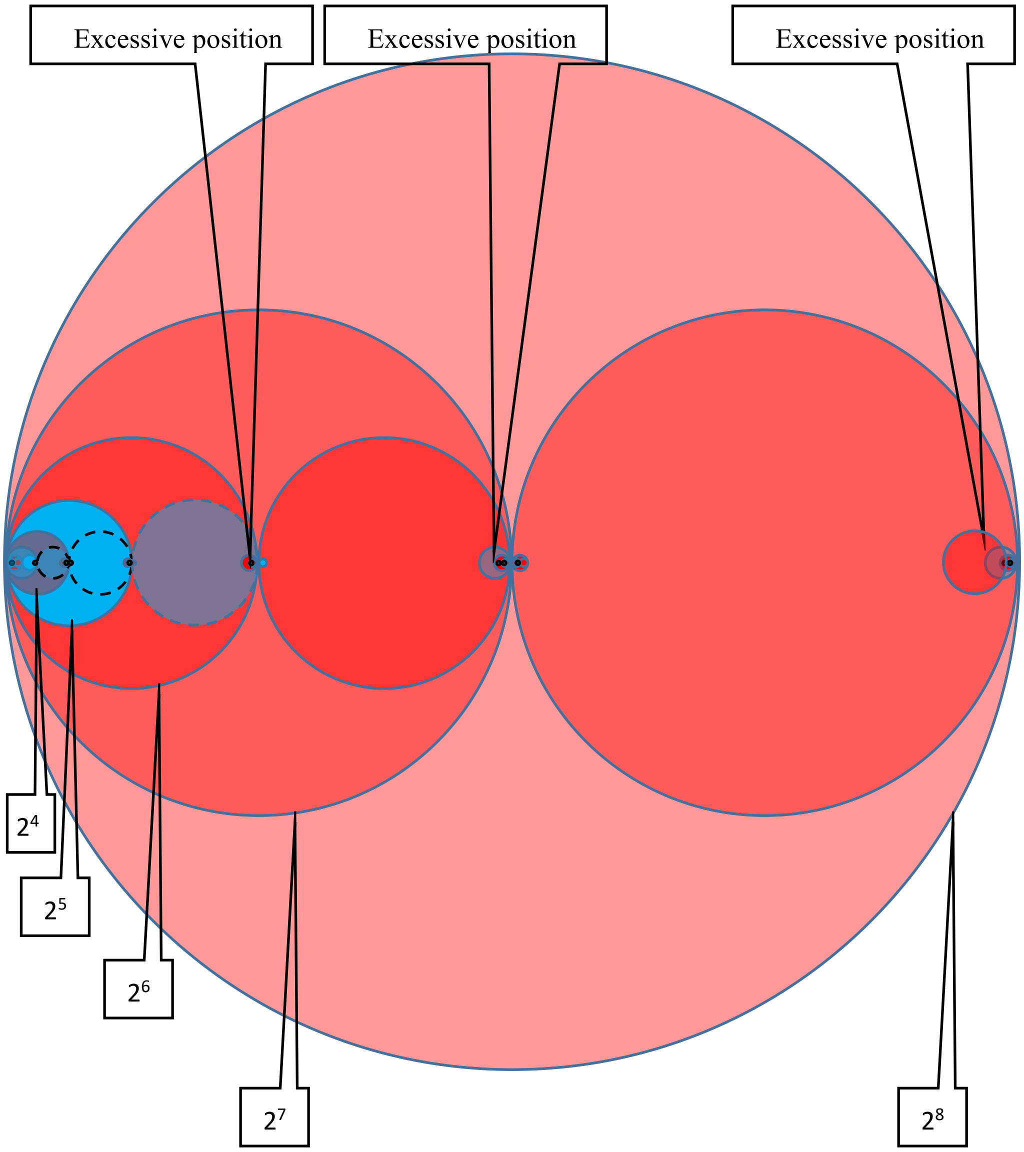


Figure 3|n= (5~7)2^n symmetric geometric structure diagram. Each time the symmetry is enlarged, the diameter is doubled.



A_8: 2^8

Figure 4| n=8 of 2^n symmetrical geometric structure diagram. It reaches the end position when it is expanded to n=8. Because when n=9, A_{10} is limited by the spatial range of the '3^6' geometric space ($729\Phi_0$), resulting in the absence of A_{10}, so A_9 cannot exist normally like A_8, and A_9 becomes a 'virtual state' at this time.

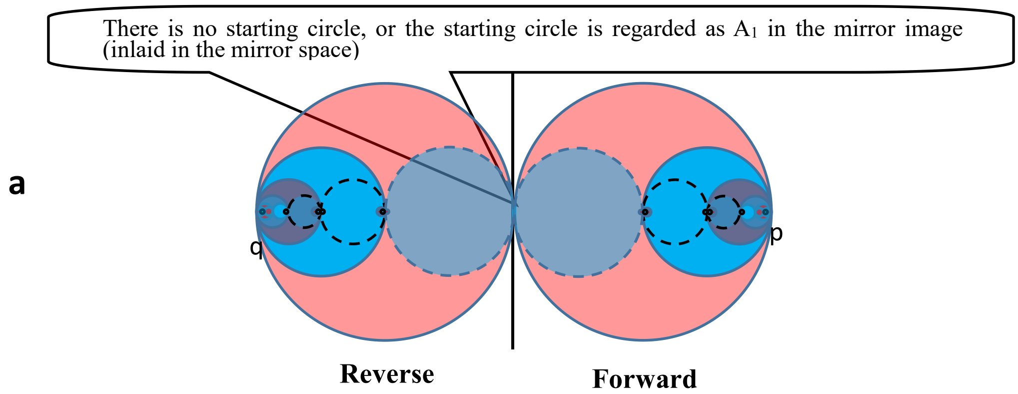


Fig .5| 'a' is the expansion without initial circle contraction. In Figure a, the diameter Φ_1 of the symmetry circle B_1 is symmetrically enlarged in a geometric form of $\Phi_1/2^n$, and the symmetry axis is used as the dividing line to produce two kinds of mirrored spaces of 'forward and reverse'. 'p and q' are the two relatively farthest points in the mirror space of each other, expanding by $(\Phi_1/2^8)\times 2^n$ from the point 'p or q' to the Forward of the 'starting circle', obviously, this opposite Forward from the starting point to the outward expansion Forward is called the expansion inverse regression. Obviously, among the n values of the symmetrical space generated during the symmetrical expansion of 2^n, the diameter Φ_8 of A_8 is the smallest. Although there is no starting circle for both 'cis and anti', we can regard A_1 in the mirror image partner as the starting circle. This kind of starting circle implies the 2^n geometric space in the mirror image, which we call "no starting circle" 'or 'invisible starting circle' or 'mirroring starting circle' or 'virtual starting circle', each name contains different spatial positions, different starting points, and different attributes (different physical meanings and spatial geometric meanings). The mirror space in this article is represented by superscript -1 or -'.

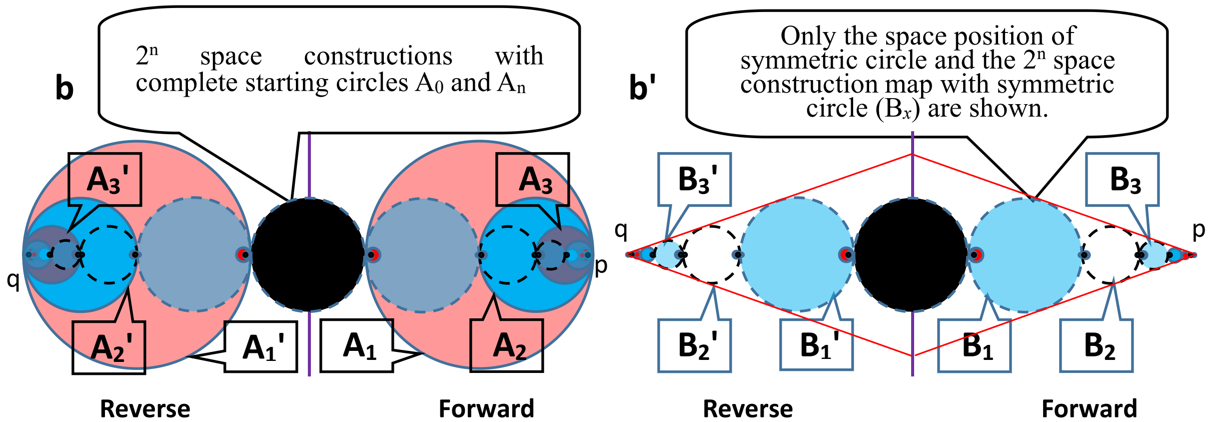


Fig .5|b is a contraction expansion with an initial circle. A_0 of the starting circle in Figure b diameter Φ_0, A_n for $\Phi_0/2^n$ geometric symmetry contraction, taking the axis of symmetry as the dividing line, produce 'cis and inverse' two mirror spaces. p and q' are the two furthest points in the mirror space, take the p and q' as the inverse regression point, starting from' p and q' points in the Forward of 'starting circle',' reverse regression', $A_n(\Phi_0/2^8)\times 2^n$ enlarged regression, obviously, is the inverse Forward relative to the outward expansion Forward from the starting point, which we call the inverse regression relative to the 'enlarged contraction', referred to as' inverse'. Obviously, the symmetrical space generated by the expansion of the symmetrical circle in the "shrinking method" of 2^n, the diameter of A_8 is the smallest (A_{9i} is an imaginary number state, not discussed here).

The b' shows only the A_n of contraction expansion a schematic diagram of the structure and location of the spatial size, in which the red line is B_x this may be the source of power for the spatial structure of flat galaxies and needs further study). A_n each of the center of the circle must be in a straight line, and the adjacent symmetric circles are tangent and $A_0=A_1=^{i}A^{-1}{}_1=A_2/2$, $A_3\sim A_8<A_0$ as a result, the symmetry points change with the n.

On the contrary, the q and p points are the starting symmetry points of the inverse regression, in which the A_n is it expands and ends at 8. A_n^{-1} of reverse regression A_n, that is either smooth or negative A_n of reverse regression mirror image $^{i}A_n^{-1}$ the starting symmetry point of the inverse regression is the symmetry point of all the inverse regressions, and the spatial position remains unchanged.

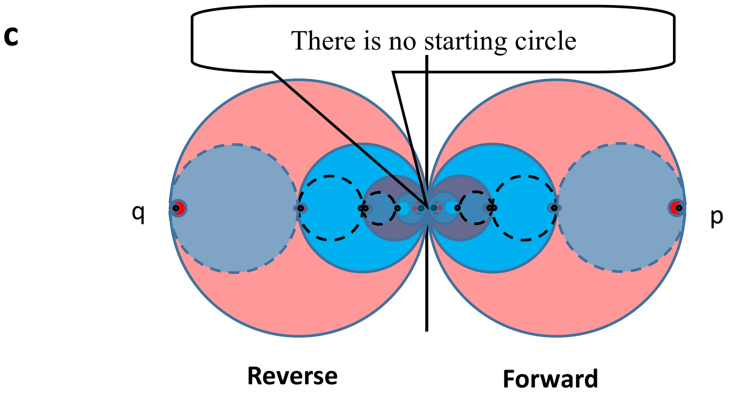


Fig . 5c| is an enlargement type expansion without a 'starting circle', and 'c' is a contraction type expansion without a starting circle. In Figure c, the diameter Φ_1 of the symmetry circle B_1 is symmetrically enlarged in the geometric form of $2^n \times \Phi_1$, and the symmetry axis is used as the dividing line to produce two kinds of mirror space of 'forward and reverse'. 'p and q' are the two relatively farthest points in the mirror space of each other, shrinking $2^8/2^n$ from the point 'p or q' to the direction of the 'starting circle'. Obviously, this is relative to the starting point The opposite of the outward expansion direction is called contraction inverse regression. Obviously, the diameter Φ_1 of A_1 in the symmetrical space generated during the expansion of 2^n is the smallest. Although there is no starting circle for both 'cis and anti', we can regard the $A^{-1}{}_1$ in the mirror image partner as the starting circle. This kind of starting circle implies the 2^n geometric space in the mirror image, which we call "no start" "Starting circle" or "invisible starting circle" or "mirroring starting circle" or "virtual starting circle", each name contains different spatial positions, different starting points, and different attributes (different physical meanings and spatial geometric meanings).

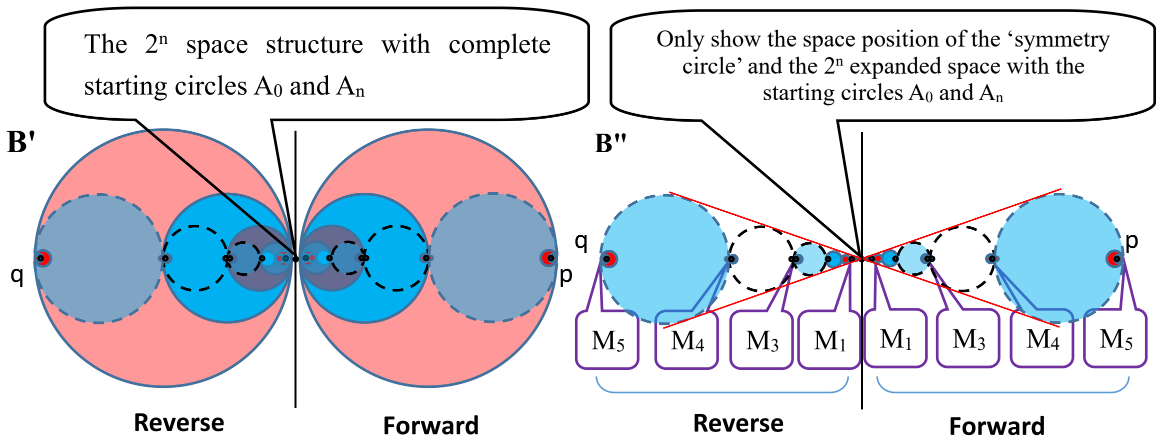


Fig . 5| d is an enlarged extension with a starting circle. In Figure d, the diameter of the starting circle A_0 is Φ_0, the diameter of A_n is symmetrically expanded in a geometric form of $\Phi_0 \times 2^n$, and the symmetry axis is the dividing line to produce two mirrored spaces of 'forward and reverse'. 'p and q' are the two relatively farthest points in the mirror space of each other, with 'p and q' as the 'reverse regression' symmetry points, from the 'p and q' points to the 'starting circle' direction Start 'inverse regression', the symmetry circle is expanded and returned by $(\Phi_0 \times 2^8) \times 2^n$. Obviously, this is the inverse direction of the expansion direction from the starting point. We call it the inverse regression relative to the expansion expansion. Referred to as 'inverse'. Obviously, in the symmetrical space generated during the expansion process of A_n 'expanding method' in 2^n, the diameter Φ_8 of A_8 is the largest value (A_{9i} is an imaginary number state, which is not discussed in this article).

b' is a schematic diagram showing only the spatial structure and location of the enlarged expansion of A^b_{n-1}. The red line in the figure is the cotangent line of A^b_{n-1} (this may be the power source of the spatial structure of the formation of the halo of the galaxy, Need in-depth study). The centers of A^b_{n-1} must be on a straight line, and the adjacent A^b_{n-1} are tangent, $A0=B_1={}^iB_1=A_2$, $A_3\sim A_8<A_0$, during the entire inverse symmetrical expansion process, A^b_{n-1}'s the symmetry point' is denoted as M_x, M_x changes with the change of the value of x, x= (1.2.3.---8).
The reverse regression of cis and reverse is the opposite, with points q and p as the starting point of 'reverse regression'. During this process, 'A^b_{n-1}' keeps shrinking, and finally ends at 8. The A^b_{n-1} of the 'reverse regression' is the mirror image of the A^b_n of the 'cis or reverse'; the starting symmetry point of the 'reverse regression' is the symmetric point of all the 'reverse regression', and the spatial position remains unchanged.

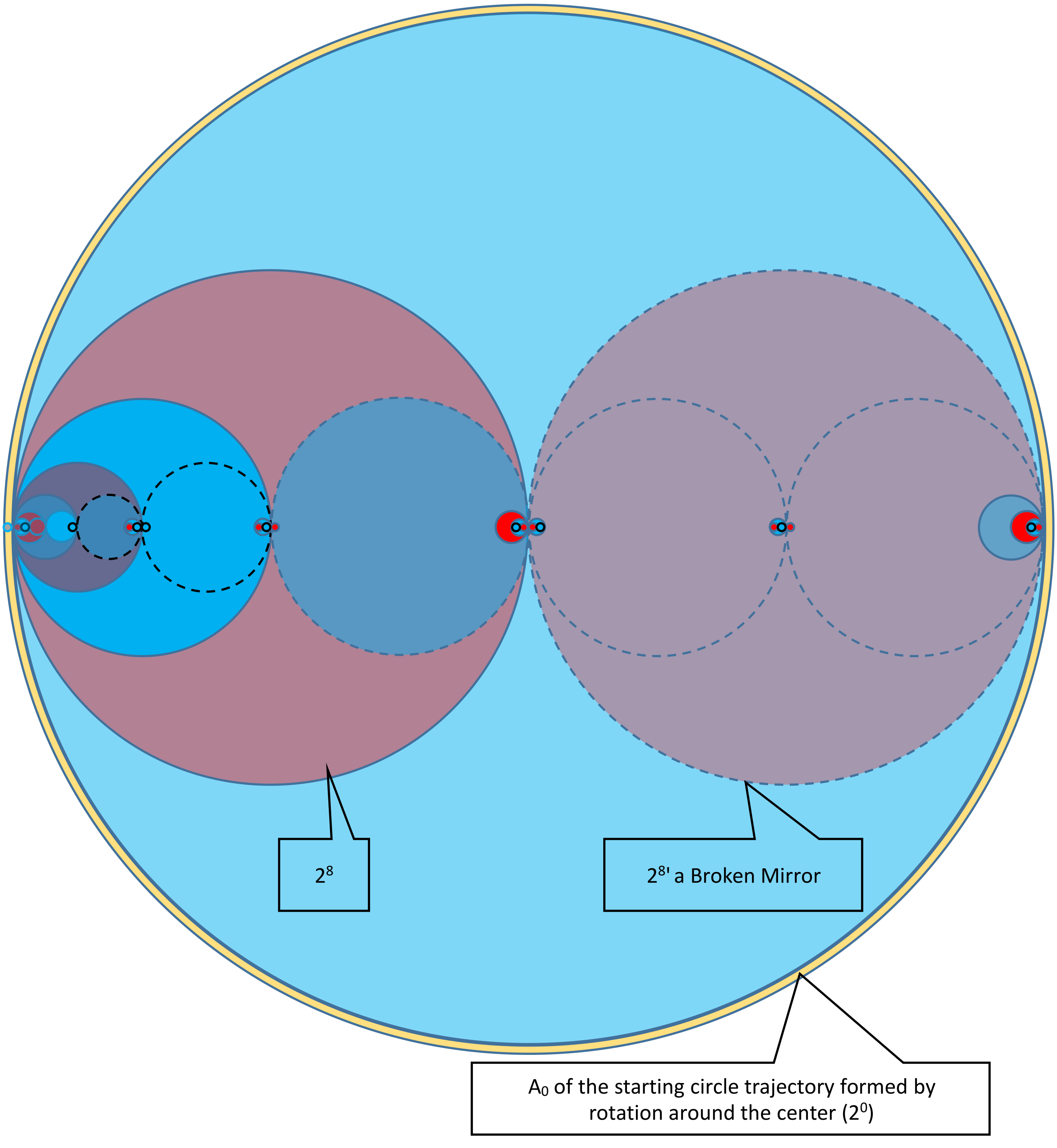


Fig .6| is the structure when the starting circle is a real number and n=8. When n=9, all $2^0+2^1+2^2+$----2^8 rotate around the center to form A_9. At this time, the Qualitative change of

A_9 , becomes higher-dimensional A_0 or A_1.

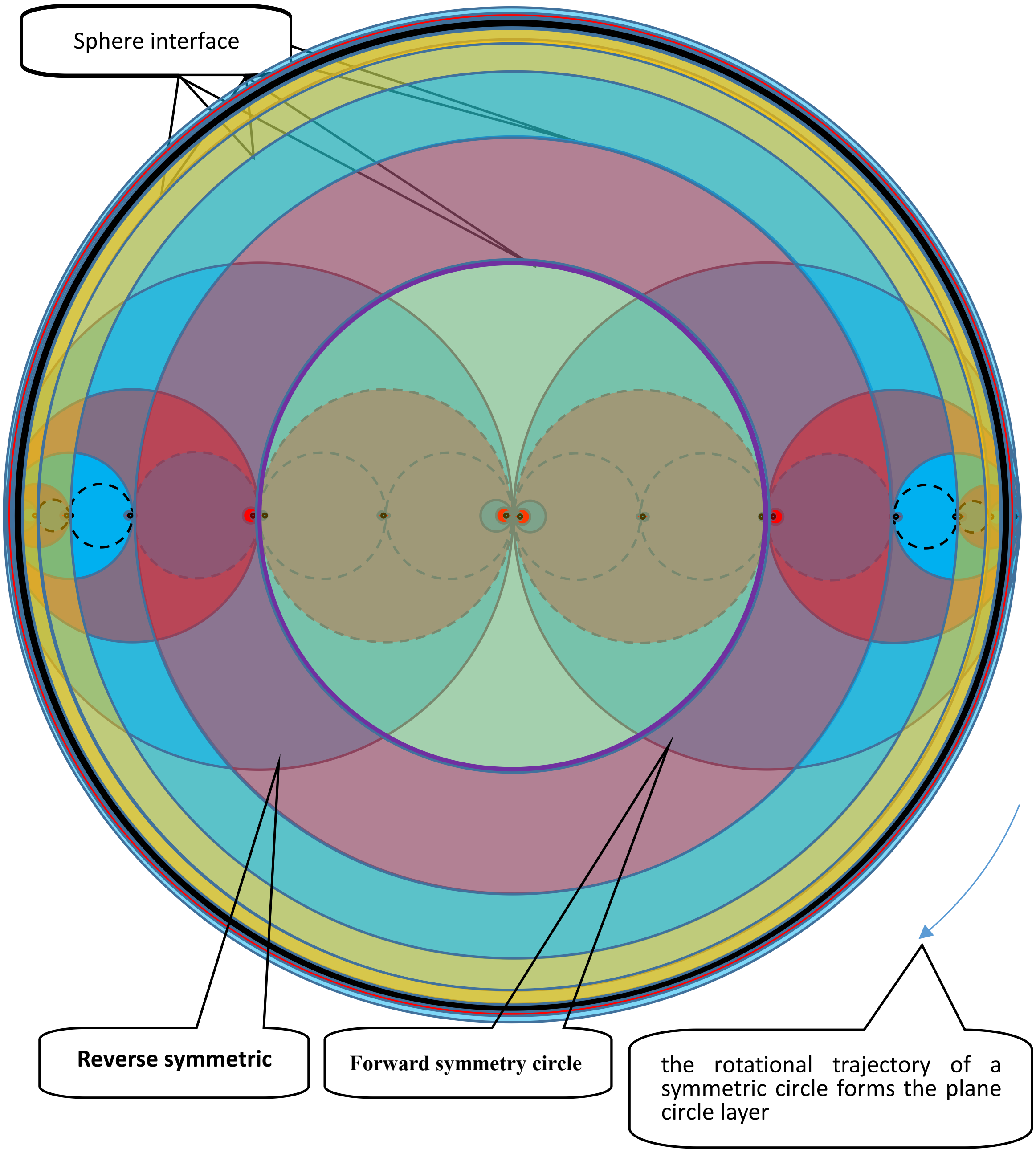


Fig7| is the trajectory of the 2^n symmetric space of the "real number" in Fig. 1 and Fig. 15 that rotates around the center point, forming the plane circle layer. The boundary of the ring formed by the rotation of each symmetric circle forms the boundary of the circle layer (the boundary of the atmosphere).

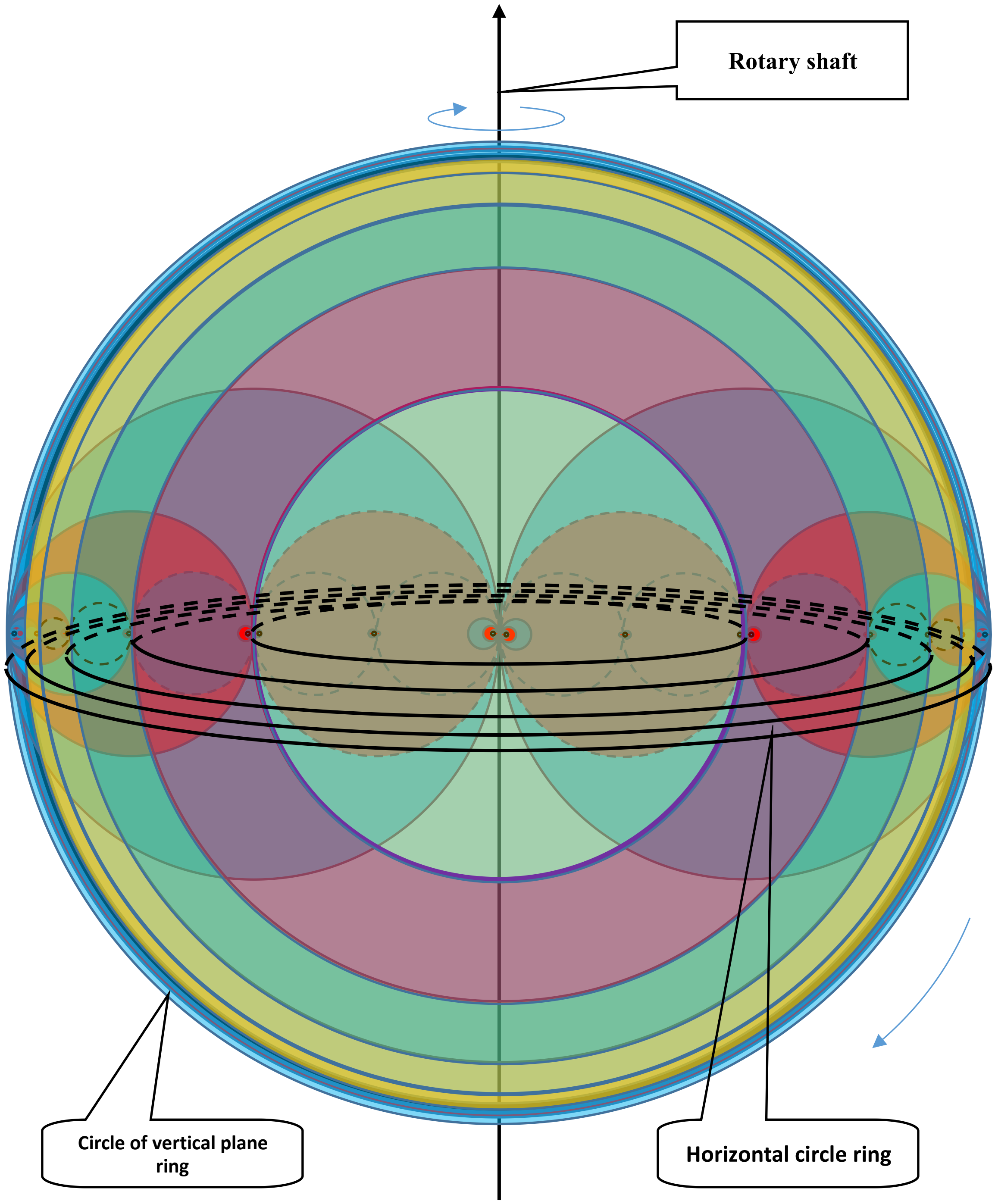


Fig 8| the trajectory of the symmetric space around the center point in figure 1 forms a plane circle ring layer, and at the same time, it rotates in a straight line around the center point in the plane, and the trajectory forms a three-dimensional circular sphere. This line is the axis of rotation of the sphere.

The change of dimension of '2n' geometric structure

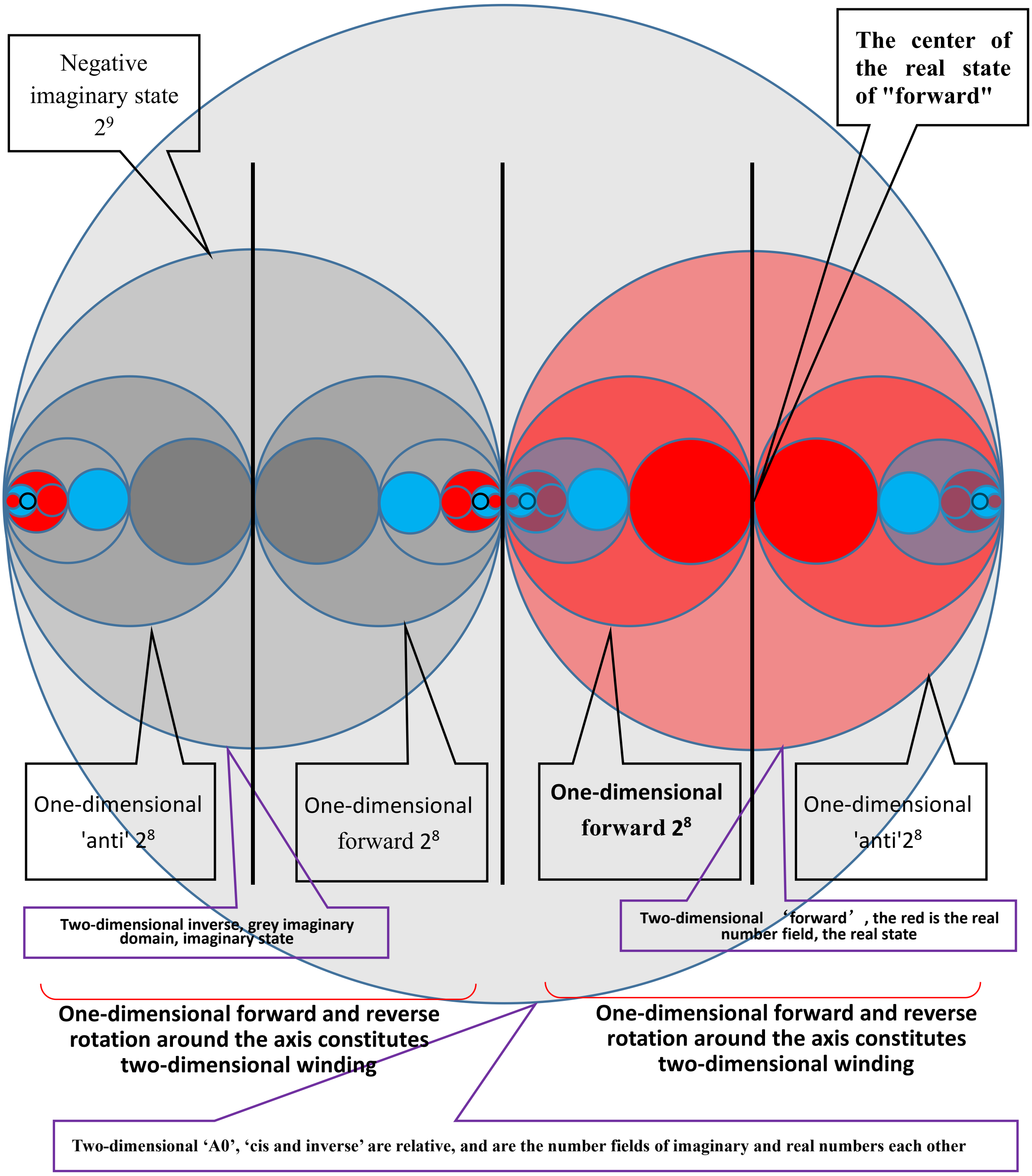


Fig .9| the black segment in the figure is the symmetry axis, the black segment in the middle is the starting symmetry axis, and the two sides of the symmetry axis are relatively cis and inverse respectively (we assume that the right side is cis). Each of the two sides of the internal sequence or reverse also contains cis and inverse, this internal cis, inverse relative to the external cis, inverse difference called hierarchical difference, referred to as hierarchy. When this difference forms eight levels, qualitative change occurs, and each eight levels is defined as dimensional changes relative to the internal or external eight levels.

1.2. Types of starting circles and the spatial structure of different starting circles

1. 2.1. Geometric illustration of sequence space division

The definition of the principal order, the spatial position, and the geometric form of the mirror symmetric space

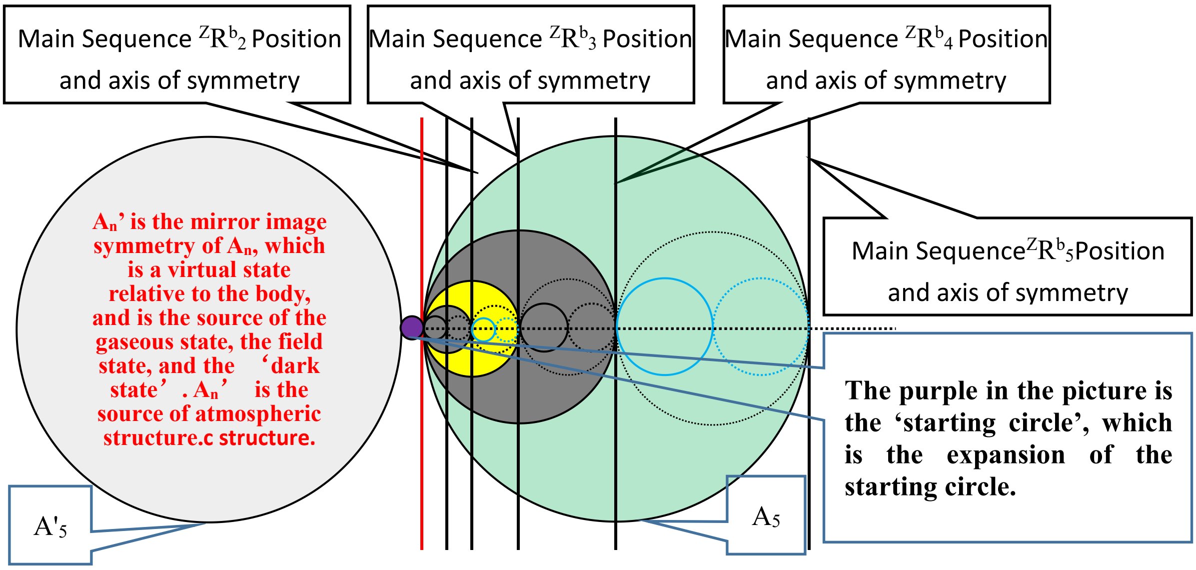


Fig .10 | the space definition of the main sequence: In the 2^n space expansion, the expansion process is sequential expansion one by one, that is, A_1 is first generated, and then A_2, A_3------A_8~A_{9i}, 9i represents The attribute of A_9 is the imaginary state (non-physical structure, gas state, field state, 'dark state', etc.) [8], each An mirrors the symmetry point of A'_n (the center of A_{n+1}), to the beginning The spatial distance of the symmetrical point is called the main sequence, or main sequence for short; it is represented by $^{Z}R^{y}$, the superscript ^{Z} represents the main sequence, ^{y} represents the type of the starting circle, and y= (a or b type). The black circle in the figure represents the forward mirror image on the right, but this mirror image is in an imaginary state, and its internal structure is not drawn.

The construction of the associated main sequence and the 2^n space system's real state, imaginary number state, and the mirror image relationship between the virtual real state

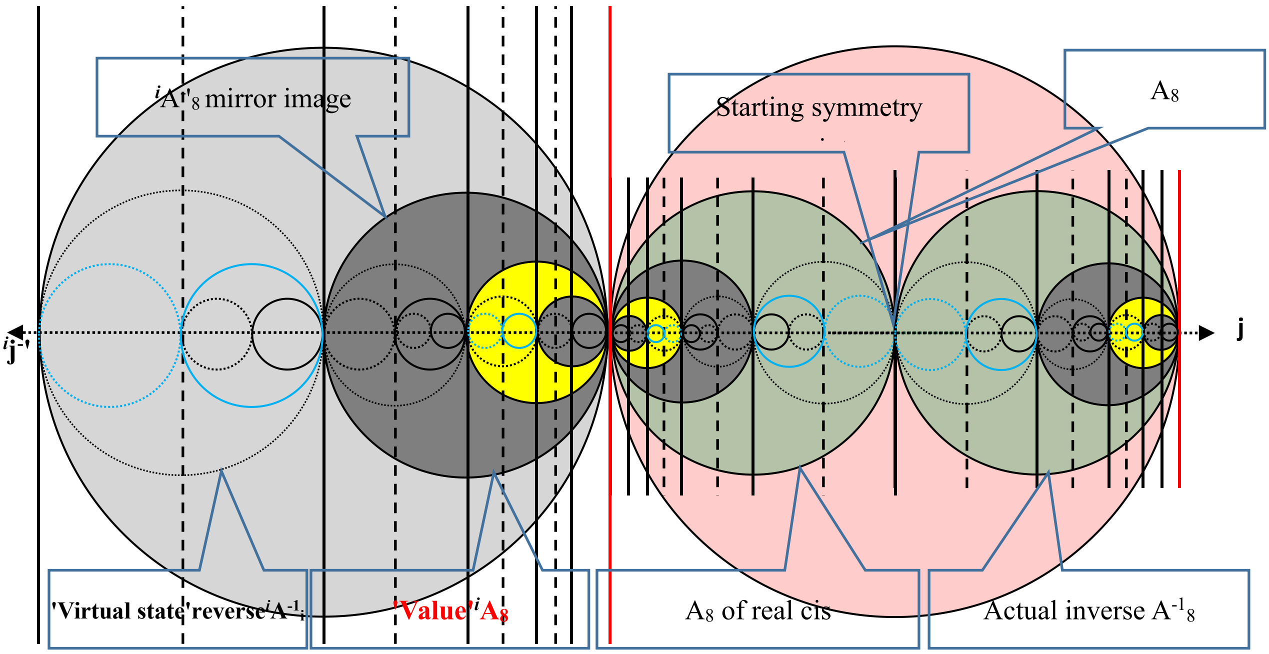


Fig . 11| the black dotted line in the diagram is the position of the associated principal sequence and the position of the symmetry axis

Fig . 11 | spatial definition of the companion main sequence: A_n main sequence is produced. According to the definition of the main sequence, the internal A_{n-1} must be accompanied by the generation of a relatively mirror-image 'anti' space, which simultaneously produces the main sequence's ontology, the sequence that also produces the mirror image is called the companion process (also the entanglement process). In the generated companion space, there are also two A_{n-1} levels of internal space that are mirror images of each other. We call the distance between the tangent point of the two mirror images of A_{n-1} (also the center of A_n) and the starting point as the companion main sequence, referred to as the companion main sequence; denoted as $^BR^y$, the superscript ^{B} represents the main sequence, ^{y} represents the type of the starting circle, y= (a or b type). In the real state A_n, the mirror space of A_{n-1} is based on the center of A_n as the symmetry point, and the symmetry direction is relative to the expansion direction of A_{n-1} and $A^{'}_{n-1}$ (on the arrow side of the straight line j). In the imaginary state ^iA_n, the mirror space of $^iA_{n-1}$ is based on the center of the circle of ^iA_n as the point of symmetry. The direction of symmetry is relative to $^iA_{n-1}$, and $^iA^{'}_{n-1}$ is in the expansion direction (the straight line ^{i}j arrow side).).

Definition of Suborder and Spatial Geometry

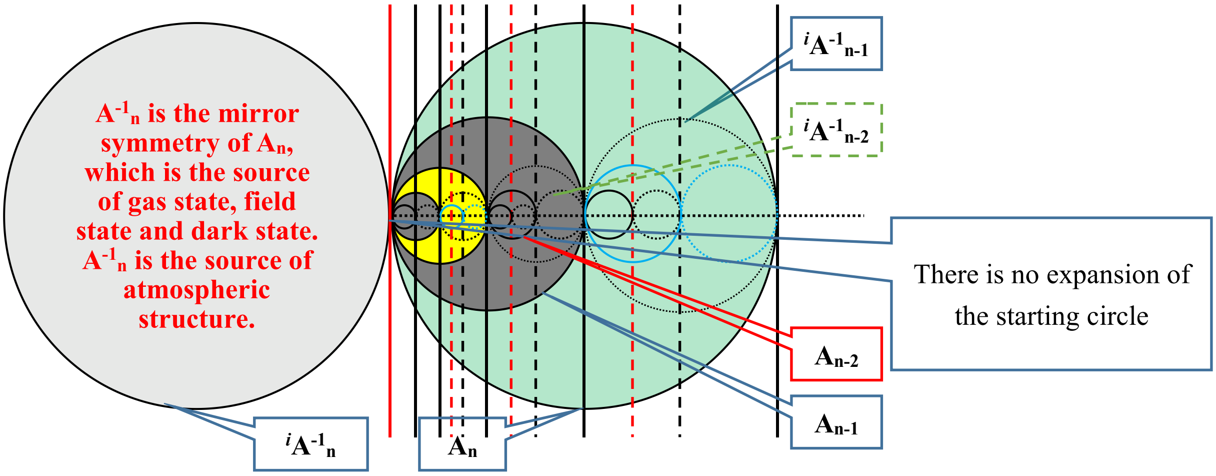


Fig .12 | Space definition of subsequence: the space between the main sequence and the companion main sequence. A pair of mirrored spaces of A^a_{n-2} will be produced. Compared with A^a_{n-1}, this space has one less level cycle change. At the same time, it is also the average sum of the spatial distance between the main sequence and the companion main sequence. The subsequences that are produced together with the companion main sequence are called subsequences of the main sequence and the companion main sequence, referred to as subsequence; the distance from the 'subsequence' to the 'starting point' is represented by $^ER^y$, and the red dashed line in the figure represents the subsequence Symmetry axis and spatial position; superscript '^{E}' means sub-sequence, superscript ^{y} means type, y= (a or b).

The geometrical space composition principle and geometric position of the starting circle virtual state subsequence (also called the anti-starting point main sequence)

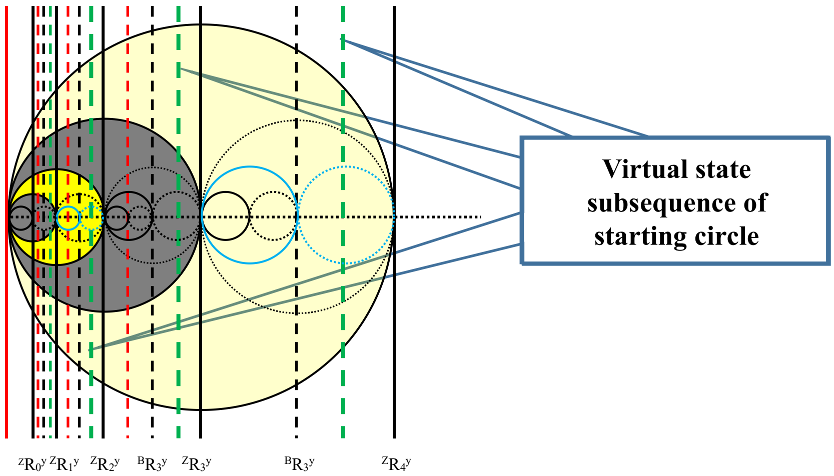


Fig . 13| Spatial definition of inverse starting circle suborder: From space, we find each of these $^BR^y{}_n$ by

the way $^{Z}R^{y}_{n+1}$ there is no division of suborder or main order between the spaces, which are relatively uniform, and we find that, $^{B}R^{y}_{n}$ by the way $^{Z}R^{y}_{n+1}$ it seems similar $^{B}R^{y}_{n}$ By the way $^{Z}R^{y}_{n}$ the main order $^{B}R^{y}_{n}$ and $^{Z}R^{y}_{n+1}$ and can combine to produce a similar $^{E}R^{y}$ because of the suborder $^{B}R^{y}_{n}$ and $^{Z}R^{y}_{n+1}$ there is a hierarchy and generation difference, and time difference, so $^{B}R^{y}_{n}$ and $^{Z}R^{y}_{n+1}$ there is no principal order, but there is an expansion of the contraction regression starting point of the reverse starting circle (starting point) at the termination circle, which produces the inverse starting point principal order, which is the imaginary number state, so the reverse principal order of the starting circle is also the imaginary number state (not expanded and discussed in detail in this paper). For the time being, we assume that the reverse starting circle suborder is the imaginary number state $^{B}R^{y}_{n}$ same $^{Z}R^{y}_{n+1}$ combined. So, 2^n in the space geometry space, there are four different types of space positions, which are the boundary of space with different attributes. When 2^n of such a plane the space rotates at the center of the starting circle or at the starting point of symmetry, A_n at each n level the rotation track will form a plane ring, which we call a plane circle ring. (See figure 7 for supplementary information).
When the plane circle is rotated by a straight line passing through the center of the circle, it forms a three-dimensional sphere structure space (see figure 7 of the supplementary information)

2.0 Earth's inner and outer circle 2^n schematic diagram of geometric space genesis

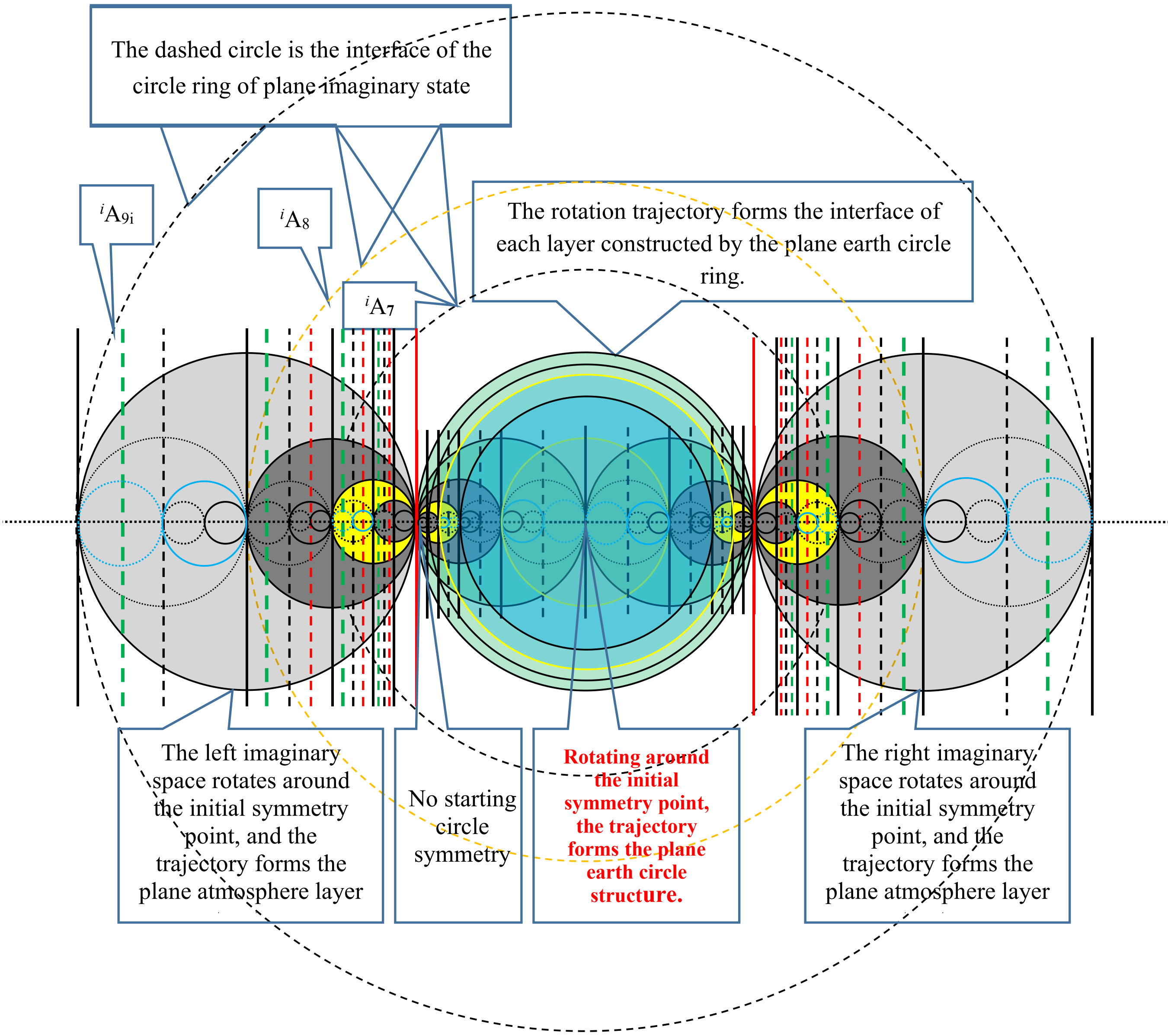
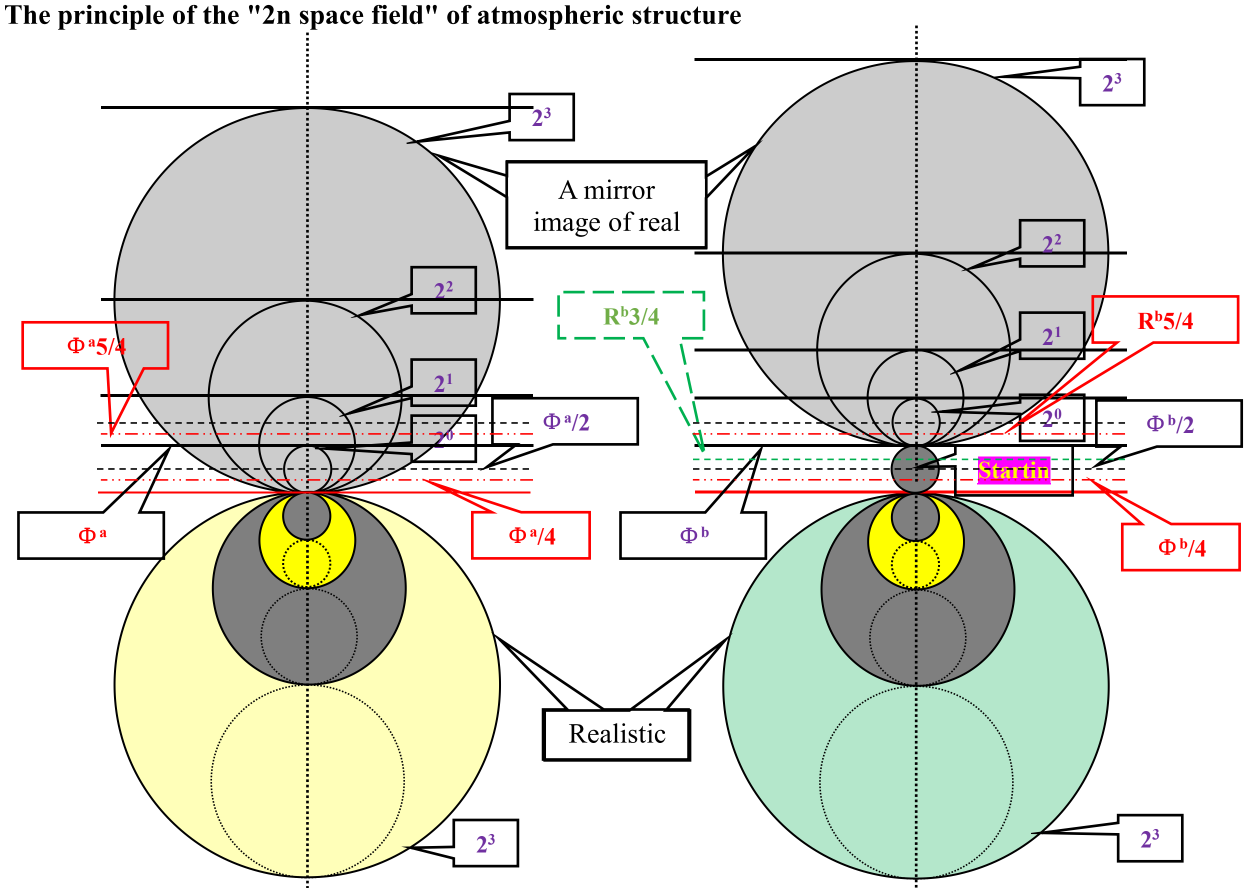


Fig .14| is the principle diagram of the 2^n geometric space formation of the inner and outer layers of the earth. Each sequence rotates around the starting point of symmetry, and the inner and outer edges of the ring formed by the trajectory form a discontinuity in the earth and the interface of the atmosphere in the atmosphere. In the figure, the superscript i of ${}^{i}A_{ni}$ represents that the dimension attribute of A_n is an imaginary state, and the subscript i of A_{ni} represents that the attribute state of A_n in this dimension is an imaginary state (virtual and real state, see available data 1). The green part in the center of the figure is the principle of the structure of the Earth's sphere. There is a mirror image on the left and right sides of the earth. This kind of mirror image is called "symmetrical double mirror image" in this article. (Because of the existence of such a symmetrical double mirror image, the body space can be centered on its own center and drive the mirror space on both sides to rotate rigidly. Otherwise, it can only rotate around the symmetric point of the mirror image, so that the atmosphere cannot be formed).

2.1 Types of starting circles and magnifications of the spatial position and geometry of starting circles

First of all, the positive and negative are relative, the imaginary state and the real state are relative, one is the internal observer of the positive or negative, and the initial circle that can be observed is inserted into the space of the other party, relative to the imaginary state. The mirror image is embedded in the imaginary state,

The principle of the "2n space field" of atmospheric structure



No starting circle (inserted into the mirror image partner) Φ^{a} type 2^n expansion

There is a starting circle (real state or imaginary state) Φ^{b} type 2^n expansion

Fig . 15 | Φ^a type 2^n expansion is a 2^n symmetrical structure without the 'starting circle' [2]. It can also be regarded as a kind of start with the 'starting circle' embedded in a symmetrical mirror image (such as forward or reverse). Starting circle structure. Therefore, the starting point of the symmetrical expansion of type a is the point of symmetry, so starting from the point of symmetry, symmetry is written as

$${}^{Z}R^{z}_{n}=2^{n}\Phi^{a}$$

The Φ^b type 2^n extension is a 2^n symmetrical structure with a "starting circle", which is a structure with an independent "starting circle" and a starting circle. Therefore, the starting point of the b-shaped symmetrical expansion is the point tangent to the starting circle, so starting from the symmetrical point, the symmetrical

$${}^{Z}R^{b}_{n}=2^{n}\Phi^{b}+\Phi^{b}$$

From the perspective of the starting circle, taking the center of the starting circle as the “axis of demarcation” and the broken symmetry axis, the two sides of the symmetry axis indicate the way of symmetry, which is the opposite way of breaking, and half is “positive”. Half is 'negative' or 'false positive'.

The figure only shows that n= (0~3), n=(3~8) is not drawn due to the limitation of layout space.

.

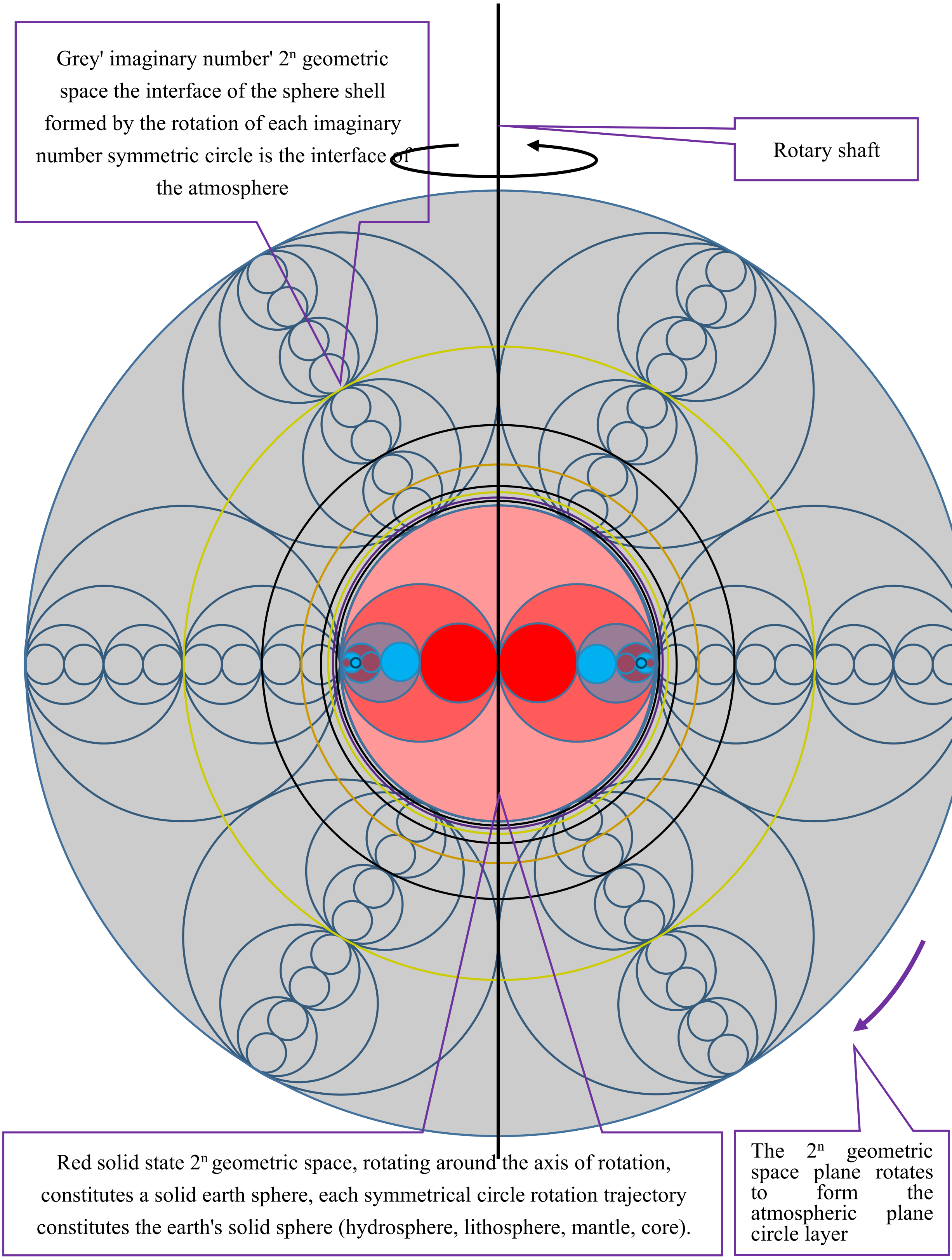


Fig .16| with the center of the two-dimensional sequence as the center, the whole sequence and reverse center rigid rotation, then, the solid state of the symmetrical circle rotation track formed a plane ring, virtual state of the solid plane circle, virtual state symmetric circle rotation track is the largest section of the earth's atmosphere, the real state plus virtual state plane rotation around the red axis (Rotation axis) constitute the earth's atmosphere layer and the earth's solid layer structure. The figure shows six mirrored structures of the earth that are tangent to each other. Each 2^n geometric space can only form two mirrored spaces on the right and left on a straight line. Therefore, other mirrored spaces do not exist. But at this point 2^n the body of the geometric space is a real state, while 2^n geometric space also has the state of negative number, positive and imaginary number, negative and imaginary number, and the superposition of these different states forms a new relative principle 2^n geometric survival 3^n screen space, higher level screen space (need more in-depth research and proof).

Data Availability Statement

Supplementary data and Supplementary information are available at https://doi.org/10.6084/m9.figshare.14211095.

Author contributions

Hu Jun formulated the mathematical model and conceptualized the model and physicalize this geometric space model. Hu Gang and Hu Meiqi performed the analysis and simulations. All authors interpreted the results. Hu Gang and Hu Meiqi jointly drafted this manuscript. Hu Jun modified, supplemented, improved and reviewed the manuscript before submission. All authors read and approved the manuscript. All authors have contributed equally to the intellectual content of the paper and the design of the analysis.

Competing financial interests

the authors declared no competing financial interests.

References

[1] I. I. Baliukin J.－L. Bertaux E. Quémerais V. V. Izmodenov W. Schmidt.
SWAN/SOHO Lyman-α Mapping：the Hydrogen Geocorona Extends Well Beyond the Moon, JGR Space Physics.
First published：15February 2019.
https://doi.org/10.1029/2018JA026136.
[2] Periodic Table of the Vertical Structure of the earth sphere.
https://doi.org/10.6084/m9.figshare.14052467.
[3] Mysterious Geosphere Structure1.
https://doi.org/10.6084/m9.figshare.12264149.
[4] Introduction to the "Six-level Symmetric Complex Number Static Multi-dimensional" Geometric Model.
https://doi.org/10.6084/m9.figshare.12251297.
[5] Introduction to plane six layers symmetrical complex number geometric space.
https://doi.org/10.6084/m9.figshare.11341385.
[6] Mirror world and planetary orbit distribution in the solar system.
https://doi.org/10.6084/m9.figshare.12694295.
[7] Mathematical layer theory.
https://doi.org/10.6084/m9.figshare.13200611.
[8] An Introduction to the Principle of Physical Properties of Geometric Space in Plane's Six-level Symmetry Complex Number.
https://doi.org/10.6084/m9.figshare.11926053.
[9] Dynamic screen space.
https://doi.org/10.6084/m9.figshare.12456674.
[10] Static screen space.
https://doi.org/10.6084/m9.figshare.12957911.
[11] Symmetry theory.
https://doi.org/10.6084/m9.figshare.12980819.
[12] Introduction to Six-level Symmetrical Multidimensional Mathematics.
https://doi.org/10.6084/m9.figshare.12456734.
[13] Symmetry theory.
https://doi.org/10.6084/m9.figshare.12980819.