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Original String Theory Can Interpret Dark Matter and Dark Energy through Multiverse

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ABSTRACT

Based on the ten-dimensional spacetime of the original String Theory, the Anthropic Principle and Causality were applied to investigate the structure of space and time, allowing the Universe to be divided into three distinct cosmoses. Drawing from newly discovered conceptions in the deep interior of the Earth, a new Earth model was reconstructed. By applying geophysics to analyze the Earth's interior and using a simplification method to calculate the data of the new Earth model, a dark planet—approximately 1.33 times the mass of Mars—was identified. It is located within the Earth, yet exists in a different cosmos from our own. Using cosmological parameter data ranging from the 1-year WMAP results to the Planck satellite 2018 results, it is found that dark energy has gradually decreased; meanwhile, the total amount of matter has increased by an equivalent amount. Those observations align with the predictions of the Big Bang Theory, indicating that the currently dark energy may be the residual energy left over from the early Universe following the Big Bang. According to this data, the high-energy-density cosmoses are expanding rapidly than our low-energy-density cosmos; therefore, dark matter in other cosmoses exerts a gravitational "drag" on stars and galaxies of our cosmos, leading to the observed accelerating expansion of the Universe.

Keyword: Dark Matter, Dark Energy, Causality, Anthropic Principle, Multiverse

1. INTRODUCTION

In 1922, Jacobus Kapteyn, the first astronomer to address the possible existence of invisible matter in the Milky Way Galaxy, used stellar velocities (Kapteyn 1922), subsequently, some scientists, Oort (1932), Zwicky (1937), Bartusiak (1988), Stsrobinskii and Zel'dovich (1988), found unobservable matter, which was called "dark matter", amounted to more than 90 % of the mass of the entire Universe. In contemporary natural sciences, researchers continue to encounter profound problems of dark matter, a hypothetical form of matter, has puzzled scientists about one century. It is generally believed to be abundant in the Universe and to have played a key role in its structural formation and evolution, yet its nature remains elusive.

In 1998, the High-Z Supernova Search Team published observations of type 1a supernova as standard candles (Riess et al., 1998), and the Supernova Cosmology Project was launched (Perlmutter et al., 1999). Two independent projects simultaneously reached the same conclusion: there is a completely unexpected accelerating expansion of the Universe. In the observable Universe, there is no indication that the Universe is expanding at an accelerating rate, and cosmologists have hypothesized the existence of an unknown component termed "dark energy" to explain this observed phenomenon. Dark energy remains a current scientific hypothesis; its physical properties have no clue, and we do not know how it works.

Scientists believe that dark energy is the force that tears the Universe apart, but dark matter condenses all things, and that the interaction of these two forces forms the structure of the Universe, as we know it today. In an effort to address these issues, this work explores the concept of original String Theory through the conception of multiverse. String Theory is quantum field theory, which has the character that when a string moving in the framework of time and space is so complex that three-dimensional space can no longer accommodate its motion orbit, there must be up to nine-dimensional space to meet the motion. Thus, all objects are considered as a nine-dimensional space of the string. This theory with Causality and Anthropic proposed a 3-cosmic framework of the Universe, which provides a basis for reconsidering the structure of the Universe as a model for understanding the interactions of dark matter and dark energy, and exploring astrophysics.

2. THE STRING THEORY COMBINES WITH CAUSALITY AND ANTHROPIC PRINCIPLES TO EXPLORE SPACETIME

To solve the problems of dark matter and dark energy, some cosmologists accept the type of multiverse today. Hugh Everett devised "the many-worlds interpretation (MWI) of quantum mechanics" (Everett 1957). He presented that the core of the idea was to interpret in the quantum world, an elementary particle or a collection of such particles, can exist in a superposition of two or more possible states of being. The MWI is a theory of multiple Universes.

David Deutsch is one of the leading figures in theoretical physics in the multiverse. He believed that this multiverse theory is the only explanation for the strange phenomenon in quantum mechanics, because it is based on rigorous mathematical equations and many experimental results (Deutsch 2010). In this case, scientists can produce the only explanation: these elementary particles do not exist only in our cosmos; it may also fly around the other cosmoses that are not ours. This means that there may be multiple cosmoses.

In the 1980s, Leonard Susskind said that it was the result of String Theory, which was used as a tool or framework to explore the concept of a multiverse and describe cosmic phenomena (Susskind 2006). We apply the original String theory, which has the characteristics of nine-dimensional space and one-dimensional time, and combine with Causality and Anthropic Principle, trying to solve the problems of multiverse.

According to Causality, an effect cannot occur before its cause, which means time has one direction and cannot be divided into some different parts, so, one-dimensional time is taken as a common standard in order of events in the Universe. Following the "Anthropic Principle", which is the simple fact that we live in a Universe set up to allow our existence. It means that three-dimensional space and one-dimensional time are taken as one cosmos as our living world; Therefore, the nine-dimensional space of the Universe can be divided into three portions, and each portion has a common time standard, which means that there is a 3-cosmic framework in the Universe, called triple cosmoses. Without breaking the nine-dimensional space of the Universe down, the ten-dimensional space-time is considered to universally exist.

3. THE UNIVERSE SHOULD BE A 3-COSMIC FRAMEWORK CONTAINING TRIPLE COSMOSES

The starting point for String Theory is the idea that the point-like particles of particle physics can also be modeled as one-dimensional objects called strings. The characteristic length scale of strings is assumed to be on the order of the Planck length (10^{-35} m) that looks just like an ordinary particle, with its mass, charge, and other properties determined by the vibrational states of it in different ways.

One notable feature of String Theory is that it requires extra dimensions of space-time for their mathematical consistency. The 10-dimensional space-time of String theory is interpreted as the product of ordinary 4-dimensional space-time and 6-extra-dimensional space, which have not been observed (Scherk & Schwarz 1975). The String Theory is now not established as well as Relativity theory, because there is no the exact boundary conditions to fit the real Universe and works out a theoretically solid basic geometry, though many mathematicians and physicists have attempted to compactify the constitution of ten-dimensional space-time model through spontaneous symmetry breaking to a four-dimensional one as our known world and 6-extra-dimensional space, which is compacted to be tiny space called Calabi-Yau space as Plank space, but no proposed method meets perfection.

In 2004, Dvali suggested that the extra dimensions of space do not curl up (not compactified) becomes minimum, but infinite in size and uncurved, just like our ordinary three-dimensional view (Dvali 2004). In particular, the theory predicts that the Universe has extra dimensions into which gravity, unlike ordinary matter, may be able to escape. This leakage would warp the space-time continuum and cause cosmic expansion to accelerate. Thus, the extra dimensions need not be small and compactify, but may be large extra dimensions, i.e., outside our ordinary three-dimensional space, there are the same six extra dimensions of space in the Universe.

Based on the String Theory and 3-cosmic framework of the Universe, there are triple cosmoses in the whole space, namely 1st cosmos, 2nd cosmos and 3rd cosmos, used U_1, U_2 and U_3 instead. The 3-cosmic framework of the Universes has characteristics, in which each cosmos describes a world of general matter, and the others describe another world, which we know nothing, and there is no fundament force of nature exists between any two cosmoses except gravitational force, i.e., cosmoses cannot observe directly with each other that is the characteristic of dark matter. So, the dark matter should be in invisible cosmoses other than ours.

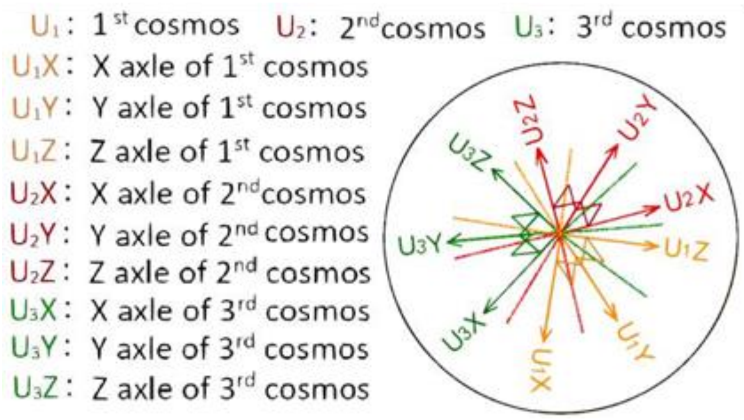

Figure 1. The imitation schematic diagram of nine-dimensional space in the 3-cosmic framework of the Universe

In the 3-cosmic framework of the Universe in Figure 1, there are three axles (X, Y and Z) all perpendicular to each other in each cosmos. Assumed a star at point P, which can be labeled 9 coordinates as: U_1Xp, U_1Yp, U_1Zp, U_2Xp, U_2Yp, U_2Zp, U_3Xp, U_3Yp, and U_3Zp, but the star locates in our cosmos, the other cosmoses cannot observe it; therefore, its coordinates are ordinarily only labeled as: Xp, Yp and Zp (Ho 2025).

4. EXPLORING DARK MATTER STARTS FROM THE EARTH

Based on original string theory and the 3-cosmic framework of the universe, we can investigate dark matter in cosmoses other than our own. The best method for exploring dark matter is to start from the Earth where we live. In the current earth model utilized in seismological investigations, such as body-wave travel times, surface-wave dispersion, and free oscillation periods for researching the chemical composition and the density distribution of the Earth, one can analyze some data of the Earth. According to the characteristics of the Earth's interior, by equitably examining its constitution, composition, temperature, density, and pressure from a different perspective of the core, the special arguments are put forward.

Some arguments on the topic of the Core Mantle Boundary (CMB), such as: 1. the CMB is the boundary of Ramsey's phase-change not silicates and iron core interface (Ramsey 1948; Lyttleton 1973); 2. Bulk modulus keeps constant that density distribution should be continuous at the CMB (Knopoff 1965); 3. Seismic reflection amplitudes show a phase-change at the CMB (Buchbinder 1968), these descriptions can be initially identified that the materials of mantle and core mixing with each other, and the density distribution between the lower mantle and the outer core should be continuous.

The isotopic composition of lavas associated with mantle plumes has previously been interpreted in the light of core–mantle interaction, suggesting that mantle plumes may transport core material to Earth's surface (Mundl-Petermeier et al. 2020; Rizo et al. 2019; Horton et al. 2023; Mundl et al. 2017). The combined ruthenium and wolfram isotope systematics of Hawaiian basalts are best explained by simple core entrainment and addition of core-derived oxide minerals at the CMB (Messling et al. 2025). The main composition of the outer core should be considered as the same ingredients of molten rock and/or mineral silicates, which are chemically consistent with the lowermost mantle and from the core brings some matter, such as the metal platinum (Hecht 1995), osmium-187 (Walker et al. 1995) have come all the way to the surface of the Earth that flows between the F layer and the Earth's crust, causing the more than 10 km relief of the CMB (Morelli & Dziewonski 1987).

The heat energy of the Earth's core in the F layer at the lowest layer of the outer core is as high as 6000 °C (Condie 1997), and the components of the magma solution can be separated freely and so causes some elements and oxides of magma to undergo oxidation-reduction reactions and separate due to its gravity thereafter. The heat of this chemical reaction (Alboussière et al. 2010) combines with the radiant heat generated by the decay of radioactive elements in the outer core, and with the nuclear fission heat that occurs from the center of the Earth (Herndon 1993), to surge up, becoming the main power source for the geo-dynamo of the consistent large convection cell of the Earth's internal material, as shown in the following Figure 2.

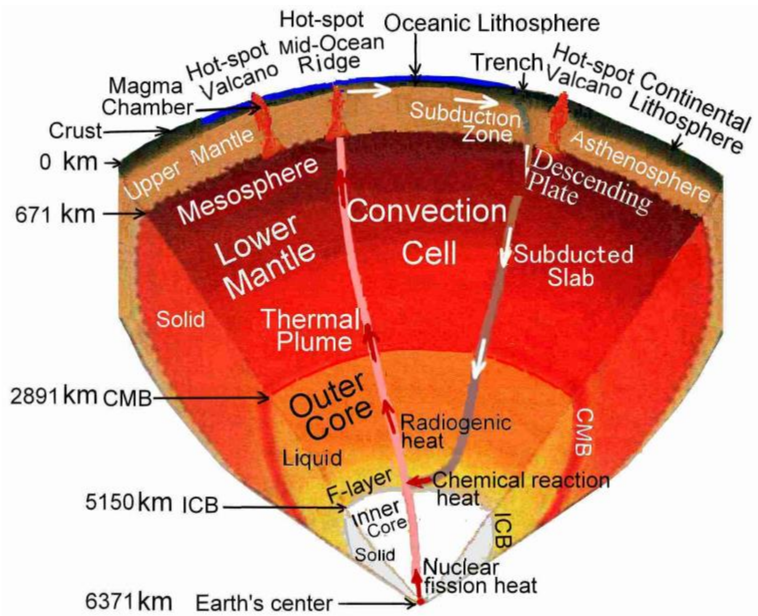

Figure 2. A schematic diagram of a great convection cell and heat flow of Earth's interior

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Based on the new conception, we apply a simplified method to evaluate the Earth's mass and moment of inertia. From the crust to the CMB, the curve of density distribution of a new earth model is adopted as the Preliminary Reference Earth Model (PREM) (Dziewonski & Anderson 1981), and from the CMB to the Inner Core Boundary (ICB), a different plotted curve is assumed. Due to a small jump in the P-wave velocity at the boundary of the F-layer in the outer core, the slope of the new density curve was nearly as steep as that of the PREM. There is a discontinuity of P-wave velocity at the ICB, so a density jump of Derr's suggestion (2.0 g/cm^3) is used (Derr 1969). In the inner core, the slope of new density curve and PREM's was the same. The density curve of the assumed new earth model compared with the PREM is shown in Figure 3 (Ho 2024a).

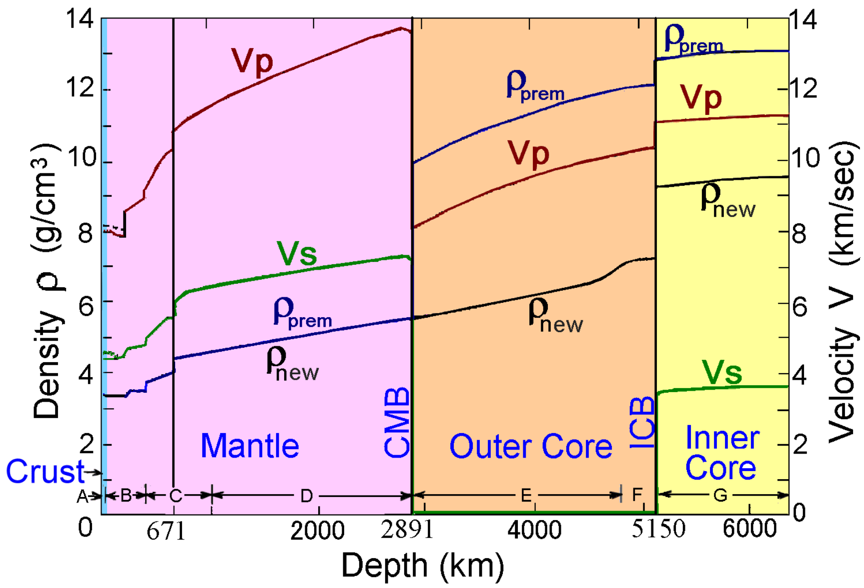

Figure 3. The density ρ of the new earth models was compared with the PREM's

5. EVALUATING THE DATA OF THE EARTH IN THE NEW EARTH MODEL

Based on the new conception, we apply a simplified method to evaluate the Earth's mass and moment of inertia. To calculate the Earth's data, the density distribution follows the divisions of the PREM into 94 levels, including 82 thin shells. The thickness of each shell is not greater than 100 km and so small compared with the Earth's radius of 6371 km that the density is linear variation within it. Then, a simplified method is applied to calculate the information of the Earth in order to simplify the calculation. The formula for the mass M of a uniform sphere can be derived as $M = (4/3)\pi\rho R^3$. The mass ΔM in each shell of the Earth's interior can be calculated as

$$\Delta M = (4/3)\pi\rho_t R_t{}^3 - (4/3)\pi\rho_b R_b{}^3 \quad (1)$$

Where: ρ_t, ρ_b are the densities at the top and at bottom, respectively, of a single shell, and R_t and R_b are the radii of top and bottom in a shell. Because the difference between R_t and R_b is small and the density is regarded as linear variation in the shell, the mean value $\bar{\rho}$ of both ρ_t and ρ_b is substituted for ρ_t and ρ_b in order to simplify the calculation. Then equation (1) becomes

$$\Delta M = (4/3)\pi\bar{\rho}(R_t{}^3 - R_b{}^3) \quad (2)$$

The moment of inertia ΔＩ in each shell of the Earth's interior can be calculated as

$$\Delta I = (8/15)\pi\bar{\rho}(R_t{}^5 - R_b{}^5) \quad (3)$$

From fluid mechanics, in a region of uniform composition, which is in a state of hydrostatic stress, the gradient of hydrostatic pressure can be expressed as

$$dP/dR = -g\rho \quad (4)$$

Where: P and R are the pressure and radius, respectively, in the region; ρ is the density at that depth; g is the acceleration due to gravity at the same depth. If the effect of Earth's rotation is negligible, the potential theory shows that g is resulted only from the attraction of mass M within the sphere of radius R through

$$g = GM / R^2 \quad (5)$$

Where: G is the gravitational constant ($6.6726\times10^{-11} m^3/kg.s^2$). Equation (5) substitutes into equation (4) and integrates it. In order to simplify the calculation, ρ and M are substituted by $\overline{\rho}$ and $\overline{m}$, which are considered constants in the thin shell and are irrelative to P and R. Where: $\overline{m}$ is the mass of a sphere as the mean value of a shell within the top radius R_t and the bottom radius R_b respectively. The result becomes

$$\Delta P = (1/R_b - 1/R_t) G\overline{m}\overline{\rho} \quad (6)$$

Where: ΔP is the difference in pressure between the top and the bottom in a layer of the Earth. Equation (6) cannot be applied to the center of Earth, where is a discontinuous point. To integrate the portion of the center, the other form is applied as follows:

$$\Delta P_c = (2/3)\pi G\overline{\rho}^2 R_c^2 \quad (7)$$

Where: ΔP_c is the difference in pressure between the radius R_c and the Earth’s center. The acceleration due to gravity g of each layer can be derived from equation (5).

According to the observed data, the moment of inertia for the polar axis of the Earth is $0.3309MeRe^2$ and about an equatorial axis is $0.3298MeRe^2$ (Garland 1979). The Earth is regarded as a sphere, of which the moment of inertia is determined to be 80286.4×10^{40} g.cm^2 by taking the mean value of both figures, where Me is the Earth's mass of 5974.2×10^{24} g and Re is the equatorial radius of 6378.14 km.

To examine the accuracy of the simple method, we applied the density distribution of the PREM to calculate the Earth's mass, moment of inertia, pressure, and acceleration due to gravity and shown in Table 1 (http://newidea.org.tw/pdf/S60.pdf). The deviation between calculated values of the earth's data from the density distribution of the PREM and the data of the PREM and the observed data of the Earth are listed in Table 2 (http://newidea.org.tw/pdf/S61.pdf). The calculated data of the simple method from the density distribution of the PREM as compared with the data of the PREM and the observed data of the Earth is shown in Table 3 and shown the curves of pressure P and deviation E of the PREM in the Figure 4 (Ho 1993).

Table 3. The calculated data of the simple method from the density distribution of the PREM as compared with the data of the PREM and the observed data of the Earth

Data	Mass	Moment of inertia	Pressure at the CMB	Pressure at Earth’s center	Gravity at the CMB	Gravity at Earth’s surface
Unit	10^{24} g	10^{40}g.cm^2	K bar	K bar	cm/sec^2	cm/sec^2
PREM and observed data	5974.200	80286.400	1357.509	3638.524	1068.230	981.560
Calculated values	5973.289	80205.664	1358.335	3655.973	1068.680	981.959
Difference %	-0.0152	-0.1006	+0.0608	+0.4796	+0.0421	+0.0406

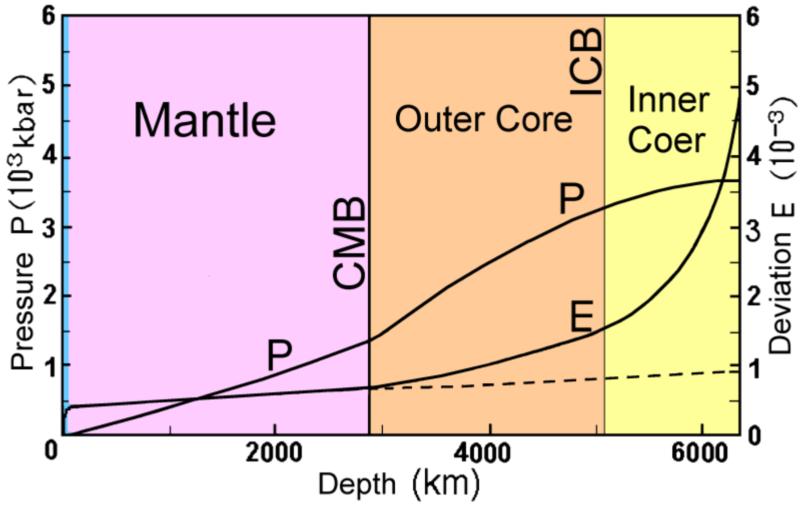

Figure 4. Pressure P of the PREM and deviation E of the calculated pressure using the simplified method from the value of P

According to Figure 4, the deviations E of the calculated Earth's values from the PREM data and observed data are nearly within 0.1%, except for the pressure at the Earth's center. This indicates that the calculated values are very close to the observed data and the simplified method is acceptable and useful; however, the calculated pressure of 3655.973 kbar at the Earth's center is higher than the PREM data of 3638.524 kbar by 0.4796 %, about 8 times of deviation E at the CMB.

According to Figure 4, the deviations E of Pressure curve from the crust to the CMB is shown nearly as a straight line, indicating that the calculated pressures have systematic errors in view of the error theory. However, from the CMB to the Earth's center, the slope of curve E sharply increases above the dashed line, which is the straight line extended from the CMB. It indicates that there is a considerable discrepancy within the core. We may suppose that the structure of the core in the PREM, which greatly affects its core pressure, is something wrong that shows PREM in the Earth’s core section need to be explored in more detail.

According to PREM, the Earth’s data of mass and the observed moment of inertia are 5974.2×10^{24}g and 80286.4×10^{40} g.cm^2 respectively. According to the new earth model and the simplified method evaluates the Earth's mass and moment of inertia, which are found to be 5121.82×10^{24}g and 76126.841×10^{40} g.cm^2 respectively. These insufficiencies between both are 852.380×10^{24} g and 4159.559×10^{40} g.cm^2 respectively as in Table 4. The Insufficiency between both that cannot be detected directly and answered clearly through ordinary Earth sciences.

Table 4. The insufficiencies of the mass and the moment of inertia in the new Earth models.

Earth model	Unit	Observed value	New Earth model
Earth’s Mass	10^{24} g	5974.200	5121.820
Insufficiency	10^{24} g		852.380
Moment of inertia	10^{40} g.cm2	80286.400	76126.841
Insufficiency	10^{40} g.cm^2		4159.559

To solve the problems of insufficiencies, a new study of the Earth is attempted by using contemporary physics. If we formulate the reasonable assumptions by the two insufficiencies of Earth's mass and moment of inertia, and successfully explain that insufficient exists under suitable conditions--the new earth model-- dark matter may be figured out.

6. EVALUATING THE DATA OF THE DARK PLANET IN THE NEW EARTH MODEL

The dark matter is considered as a planet, called a dark planet, whose form is similar to Mars, and whose characteristics are based on the inner planets of the solar system. To cut a figure of the dark planet, it is considered a sphere whose radius and density can be calculated from the insufficiencies in the Earth's mass and moment of inertia through the simplified method. The data of dark planet can be calculated as following.

Considering the density of rock on the surface of the Earth and the Moon, the surface density 2.70 g/cm^3 of the dark planet is proposed. Under the condition that the density of a layer is proportional to its depth, a trial value of density at the center of the dark planet is selected, and applying the equations (2) and (3) to calculate the mass and the moment of inertia of each shell, the total mass and moment of inertia of it should be gotten.

Because the radius and the center density of the dark planet are the hypothetical values, but the total mass and moment of inertia are necessary to correspond to the insufficiencies of the Earth's; therefore, it is necessary to use a trial-and-error method approach to determine the proper radius and the center density.

Since the Earth's orbit around the Sun may be affected by the gravity of the dark planet, but no abnormal effect on the Earth has been observed. An assumption is suggested that the gravity centers of the Earth and the dark planet coincide with each other at the same point. It is inferred from the phenomenon in which the same side of the Moon always faces the Earth that means the dark planet should rotate synchronously with the Earth.

Based on mechanics, the gravity at each shell inside the Earth is affected by the mass of the Earth and the dark planet within its radius. The pressure difference $\Delta P'$ between the top and the bottom of a shell within the Earth is calculated through

$$\Delta P' = (1/R_b - 1/R_t) G \overline{M}' \overline{\rho} \tag{8}$$

Where: $\overline{M}'$ is the mean value of the total mass of the Earth and the dark planet within the radius R_t and R_b.

Equation (8) cannot be applied to the Earth's center. The average density $\overline{\rho}'$ of the central portion combined with the Earth and the dark planet within the radius R_c can be calculated through

$$\overline{\rho}' = (Mc + Md) / [(4/3)\pi R_c^3] \tag{9}$$

Where: Mc and Md are the masses of central portion in the Earth and in the dark planet, respectively.

The difference of pressure $\Delta P_c'$ between the top and the center of the central portion in the Earth can be obtained through

$$\Delta P_c' = (2/3)\pi G \overline{\rho}\,\overline{\rho}' R_c^2 \tag{10}$$

Based on the characteristics of the inner planets of the solar system, the radius and the average density of a suitable dark matter of planet must be compatible with it. The precise data for the Earth and the dark planet were calculated from the density distribution of the new Earth model. The data for the Earth planet are listed in Table 5 (http://newidea.org.tw/pdf/S62.pdf), the dark planet is listed in Table 6 (http://newidea.org.tw/pdf/S63.pdf), and the global data for the new Earth model in Table 7 (http://newidea.org.tw/pdf/S64.pdf). After the calculation, the new earth model compared with those data of the current Earth and the PREM are listed in Table 8 (Ho 2024b).

Table 8. The calculated data of the new earth model compared with those of the Earth and the PREM

Data of planet	Radius	Mass	Moment of Inertia	Average density	Center density	Center pressure	Coef-ficient
Unit	km	10^{24}g	10^{40} g.cm^2	g/cm^3	g/cm^3	kbar	C
PREM and current Earth	6371.000	5974.200	80286.400	5.515	13.08848	3638.524	0.3309
Earth planet	6371.000	5121.820	76126.841	4.7284	9.49821	2805.297	0.3662
Dark planet	3700.375	852.380	4159.559	4.0161	7.96097	1115.272	0.3564

Finally, a planet of dark matter, called dark planet, with a radius of 3700.375 km, about 1.33 times of Mars, is reasonably inside the Earth in the extra dimensions of space other than ours own.

7. DARK ENERGY SHOULD BE INTERPRETED THROUGH THE BIG BAN THEORY

In the 1920s, Georges Lemaître proposed **"**The Big Bang Theory**"**. In the beginning of the Big Bang, the Universe was made up of high-temperature and hot energy with uniformity and isotropy, but no matter (Lemaître 1927). When this hot energy expands very quickly outwards, an exponential inflation occurs (Guth 1982). As the Universe expands rapidly and temperature decreases, the distribution of energy changes slightly, according to Einstein's famous equation ($E=MC^2$) for energy and mass interchange gradually, creating the earliest substances.

In 1964, the discovery of Cosmic Microwave Background (CMB) by radio astronomers Penzias and Wilson was the most important evidence to test the Big Bang Theory (Penzias & Wilson, 1965). As there is more and more astronomical and physical evidence, as in November 1989 Cosmic Background Explorer (COBE) launched and measured the results of the cosmic microwave background radiation spectrum, found the temperature value of CMB constant varies little from place to place, with only a deviation of one hundred thousandth of a percentage point, confirming the existence of the Big Bang Theory. Then the 21st-century Wilkinson Microwave Anisotropy Probe (WMAP) and Planck Satellite launched and measured the spectrum map of black body radiation curve, and scientists believed in The Big Bang Theory.

The Big Bang Theory is based on two basic assumptions: universality of the laws of physics and the cosmological principle that the Universe is uniformity on a large scale and isotropy. This nascent Universe expanded in all directions and gradually cooled down to form today's Universe. In 2018, the best observations from Planck Satellite detected tiny temperature fluctuations in the radiation of the Universe, and found normal matter from galaxies and stars accounts for only 4.94 % of the Universe's contents, with the rest missing contents, including dark matter, which accounts for 26.64 %, and mysterious dark energy, which accounts for 68.42% (Aghanim et al. 2020).

Dark energy is one of the most mysterious phenomena in current physics. To research dark energy, we applied the eight data of cosmological parameters of WMAP results and Planck Satellite results from 2003 to 2018 for 15 years to form a table, whose Hubble constants nearly gradually decrease, and selected one set at each observation shown as in Table 9 (Ho 2022).

Table 9. The data of cosmological parameters obtained from WMAP results and Planck results

Source / Symbol	1-year WMAP (Spergel et al. 2003)	3-year WMAP (Spergel et al. 2007)	5-year WMAP (Komatsu et al. 2009)	7-year WMAP (Komatsu et al. 2011)	9-year WMAP (Bennett et al. 2013)	Planck 2013 (Ade et al. 2014)	Planck 2015 (Ade et al. 2016)	Planck 2018 (Aghanim et al. 2020)
H_o	71.0	70.4	70.5	70.2	70.0	68.14	67.31	67.32
$\Omega_b h^2$	0.0224	0.02186	0.02267	0.02255	0.02264	0.022242	0.02222	0.02238
$\Omega_c h^2$	–	–	0.1131	0.1126	0.1138	0.11805	0.1197	0.12011
$\Omega_m h^2$	0.135	0.1324	0.1358	0.1352	0.1364	–	–	0.14314
Ω_Λ	73.22%	73.2%	72.6%	72.5%	72.1%	69.64%	68.5%	68.42%
Ω_m	26.78%	26.8%	27.32%	27.43%	27.9%	30.36%	31.5%	31.58%
Ω_b	4.44%	4.41%	4.56%	4.58%	4.63%	4.79%	4.9%	4.94%
Ω_c	22.34%	22.39%	22.8%	22.9%	23.3%	25.43%	26.42%	26.64%
Ω_v	0.02%	0.08%	0.10%	0.08%	0.04%	0.14%	–	–
Ω_{tot}	1.020	1.08	1.099	1.080	1.037	–	–	–
t_0	13.70	13.73	13.72	13.76	13.74	13.784	13.80	13.80

Taking the cosmological parameters of Planck 2018 results VI as the current situation of the Universe, we have description of parameter symbols and definitions and denote as in the following:

$\Omega_b h^2$: Physical baryon density
$\Omega_c h^2$: Physical cold dark matter density
$\Omega_m h^2$: Physical Matter density
Ω_Λ: Dark energy density / Critical density
Ω_m: Physical matter density / Critical density
Ω_b: Physical baryon density / Critical density
Ω_c: Physical cold dark matter density / Critical density
Ω_v: massive neutrinos density / Critical density
Ω_{tot}: Total mass-energy density of the Universe

t_0: Age of the Universe (Gyr)
H_o: Hubble's constant (100h km/Mpc·s)
1 megaparsec (Mpc) = 3.09×10^{19} km
$h = H_o/100$
$\Omega_b = \Omega_b h^2 / (H_o/100)^2$
$\Omega_c = \Omega_c h^2 / (H_o/100)^2$
$\Omega_m = \Omega_m h^2 / (H_o/100)^2$
$\Omega_{tot} = \Omega_\Lambda + \Omega_m$
$\Omega_m = \Omega_b+\Omega_c+\Omega_v$, (some Ω_v include in Ω_b)

8. DARK ENERGY SHOULD BE THE RESIDUAL ENERGY OF THE UNIVERSE AFTER BIG BANG

According to the table of cosmological parameters from WMAP results and Planck Satellite results, the dark energy density Ω_Λ from 1-year WMAP results (Spergel et al. 2003) to Planck 2018 results VI (Aghanim et al. 2020) for 15 years, the value from 73.22% decreases gradually down to 68.42%, decreasing 4.8%, but the value of total matter density Ω_m, increases gradually from 26.78% up to 31.58%, increasing 4.8%. As the Universe expands rapidly, the temperature drops, and gradually cools down, then energy transforms into the building blocks of matter. From the table, the losing dark energy is equal to increasing the total matter that is consistent with the narration of the Big Bang Theory.

Taking the cosmological parameters of Planck 2018 results VI as the current situation of the Universe, we may imagine that at the firstly time of the Big Bang, the full energy (100% energy density) of the Universe gradually loses, after 13.8 billion years later till now, remains 68.42% energy density, which is called dark energy density, and creates 31.58% total matter density, so, according to the Big Bang Theory, we should take the current dark energy as the residual energy of the Universe after Big Bang.

9. ACCELERATING EXPANSION OF THE UNIVERSE CAN BE INTERPRETED THROUGH 3-COSMIC FRAMEWORK

After WMAP *and* Planck *Satellite detected, t*he current actual temperature of Cosmic Microwave Background Radiation (CMBR) in our cosmos is only 2.725 °K, which is awfully close to the absolute zero (0°K = −273.15°C); therefore, the energy of our cosmos is so poor that cannot contribute to an accelerating expansion of the Universe.

According to the Table 9, cold dark matter density from 1-year WMAP results to Planck 2018 results VI, the value from 22.34% increases gradually up to 26.64%, increasing 4.3%, and baryon (normal matter) density in our cosmos from the value 4.44% increases gradually up to 4.94%, only increasing 0.5%, which compares to increasing rate of cold dark matter density, the ratio is about 1/8.6. Temperature is a display of the thermal motion of microscopic particles, therefore hot energy must display its hot temperature. The baryon density increasing value is so small that indicates energy in our cosmos so poor that we can call ours a low-energy-density cosmos; on the contrary, cold dark matter density increasing in value is so large that we can call it high-energy-density cosmoses, which are other cosmoses than ours.

Under the situation of 3-cosmic framework of the Universe after Big Bang, dark energy density 68.42% is remainder today, but the lost 31.58% transforms into total matter density, which contains baryon density 4.94 % in our cosmos and cold dark matter density 26.64 % in other cosmoses. Because current dark energy density 68.42% is bigger than total matter density 31.58% about 36.84%; therefore, so much dark energy certainly will put the Universe rapidly expanding that means the Universe is still in a high-energy state and can rapidly expand. Under the 3-cosmic framework of the Universe, the rate of expansion in a high-energy-density cosmos will be much higher than that of a low-energy-density cosmos as ours.

Based on the String Theory, the property of fundamental interaction forces of nature, except gravitational force, the other fundamental forces (including strong nuclear force, weak nuclear force, and electromagnetic force) cannot penetrate into the other cosmos; therefore, the energy of one cosmos cannot affect the other cosmos. As a result, the dark energy of high-energy-density cosmoses cannot directly contribute to the expansion of our low-energy-density cosmos, but when the high-energy-density cosmoses more rapidly expand than our low-energy-density cosmos, its matter (i.e., dark matter for our cosmos) will expand at the same pace, which meanwhile uses its gravity to drag stars and galaxies of our low-energy-density cosmos away at the same pace to expand. This is the effect of tugging stars and galaxies of the Universe at accelerating expansion in our view.

10. DISCUSSION

10.1 Chandler wobble should confirm dark planet inside the Earth but in another cosmos

It is difficult to directly examine the existence of dark matter; however, that can be recognized from Chandler wobble. Referring to the orientation of the rotation axis of the Earth in space in addition to both precession and nutation, there is a wobble on the instantaneous axis of rotation of the Earth itself. The wobble alters the position of a point on the Earth relative to the pole of rotation. In 1891, Chandler pointed out that there are two distinct kinds of the wobble periods. The first is a period of 12 months, and the second is a period of 433 days, which is approximately 14 months. The former, called annual wobble, is obviously affected by the seasonal climate. The latter, called Chandler wobble, has not been solved for more than one hundred years (Chandler 1891). The Chandler wobble is a small deviation that changes by approximately nine meters at the point on the surface of the rotation axis of the Earth.

In 2000, Gross found that two-thirds of the Chandler wobble was caused by fluctuating pressure on the seabed, which, in turn, is caused by changes in the circulation of the oceans caused by variations in temperature, salinity, and wind. The remaining third is due to atmospheric fluctuations. The full explanation of this period also involves the fluid nature of the Earth's core and oceans. The wobble, in fact, produces a negligible ocean tide with an amplitude of approximately 6 mm, called a "pole tide" (Gross 2000), which is the only tide not caused by an extraterrestrial body. While it has to be maintained by changes in the mass distribution or angular momentum of the Earth's outer core, atmosphere, oceans, or crust (from earthquakes), for a long time the actual source was unclear, since no available motions seemed to be coherent with what was driving the wobble.

The fixed side of the Moon always orbits around Earth, which is of the Moon's synchronous rotation with the Earth. The same phenomenon will happen to the Earth and the dark planet in which both rotate synchronously, but the rotation axes of both are impossible to coincide with each other, i.e., an angle between the two rotation axes produces the Chandler wobble as the nutation due to the effects of the Moon on non-parallel rotation axes with the Earth's, so the effect of Chandler wobble should confirm the existence of a dark planet inside the Earth but in another cosmos than ours.

10.2 The quantum experiments indicate the existence of the multiverse in space

In classical physics, matter is made up of particles, which are entities that conform to a simple orbit and can calculate their motion, velocity, angle, and speed at any one time; for example, an elementary particle in atom ─ electron, in Newton's classical mechanics, rotates around the nucleus in a circular orbit, and the position, momentum, and orbit of each particle is fully predictable, and it is only in a single place at the same time. This idea is similar to the case in our solar system, but beginning in the 1920s, quantum experiments have shown that in the atomic structure, each electron surrounds the nucleus, not in a stable orbit, but appears intermittently in different places, which can only be counted by probability or statistics, i.e., the elementary particles do not have a purely exact position. The only explanation is that these particles exist not only in our cosmos but also in other cosmoses, indicating the existence of multiverses in space.

10.3 The existence of a dark planet X can solve problems of astronomical observation in solar system

In 1970s, Joseph Brady historically published records of the observation of Halley's Comet and found that its approach to the Sun has always been errors of 3 or 4 days in the predicted time of the perihelion passage. The prediction of Halley's Comet, Brady based on studies of periods of Halley's Comet using old European and Chinese records and used a computer to treat the data of it in a numerical model of the solar system. He has been able to predict an invisible X planet (trans-plutonian planet), affecting the orbit of Halley's Comet. It was about three times the size of Saturn, with highly inclined orbit ($i = 120°$, $e = \pm 0.07$) to the ecliptic and the period of it to be 450 years (Brady 1971, 1972).

In 1980s, scientists found that Uranus and Neptune were pulled off and deviated the normal orbit by an unknown force in the solar system; this unknown force may have come from an unknown planet, with its gravity disturbing these two giant planets. Flanders proposed a search for an X planet, which has about three times the mass of the Earth and a highly inclined eccentric orbit that accounted for all the perturbations on the motions of Neptune (Flandern 1981).

In 1988, NASA research scientist John Anderson, from observed astronomical data of the nineteen centuries presented the deviation of Neptune and Uranus in the regular orbit and proposed "The Theory of X Planet". The mass of X planet is about five times that of the Earth and its period is about 700～1000 years. The orbit is elliptical and the inclination from the orbit to ecliptics large and almost perpendicular (Anderson 1988). Now the planet X has been searched for, but it remains to be found.

The Pioneer 10 and 11 spacecraft launched in 1973 and 1974 respectively, when the spacecrafts approached Neptune and Uranus, unknown objects were found that could affect their operations. In 2002, John Anderson and colleagues' previous analyses of radio Doppler and ranging data from distant spacecraft in the solar system indicated that an apparent anomalous acceleration is acting on Pioneer 10 and 11, with a magnitude about 8×10^{-8} cm/s^2, directed towards the Sun. The effect is clearly significant and remains to be explained. Their tracking Pioneer 10 have assessed all known mechanisms and theories, but have so far found nothing, and cannot explain this Universe's mystical power; the probe has revealed an unknown force. The existing cosmology and space navigation theory will face a significant impact (Anderson et al. 2002).

If we consider a dark planet X, which orbits around the Sun in the other cosmos than ours, then its gravity will sometimes affect the motion of Halley's Comet, Neptune, Uranus, Pioneer 10 and 11 spacecrafts, therefore, the problem of the invisible object may be solved, and that can solve problems of astronomical observation.

10.4 The interaction of dark matter and dark energy dominates the fate of the Universe

Scientists assume that dark energy is thought to be the force that tears apart the Universe, but the gravity of dark matter condenses everything, and the two forces mutual act on that dark matter and dark energy dominate the fate of the Universe and formed the structure of the Universe as we know today. Energy causes the Universe expansion, because of its hot temperature, but matter makes each other’s shrinkage because of the gravity, however, from the data of 2018 Planck results VI, current dark energy density 68.42% is bigger than total matter density 31.58% about 36.84%; therefore, this much dark energy will certainly put the Universe rapid expansion.

As a result of the discovery of the 1a supernova, scientists speculate that the Universe continues to expand, and the speed is expanding faster and faster, and the structure of the space-time is unable to maintain the integrity of the Universe, making it colder and colder. Expansion keeps neighboring stars away and increasingly lonely, and becomes isolated star-and-planet, until the star's nuclear reactor runs out of fuel, tearing up the entire star system to the point where it tears up matter itself, and breaking the chemical bond, every atom of everything is torn apart, everything is broken down into elementary particles, leaving a dead-end remnant, and that is the end of the Universe — the **“**Big Rip**”** (Ellis et al. 2012). Our Universe will eventually form an icy world of eternal complete silence, with no living thing to exist, and scientists estimate that it will take at least fifty billion years to happen. The Universe is expanding faster and faster, keeping galaxies farther apart, and is expected to tear the Universe apart, as if it were going to win the cosmic war.

The accelerating expansion of the Universe are different from “Dao”, which came from a Chinese well-known philosopher Lao-tzu’s “Dao De Jing” in the Spring and Autumn Period (about 2500 years ago). In chapter 25 of “Dao De Jing” described: **“**Something is blended, which is born peacefully and scarcely before the Universe appears, independent without change, revolving around without losing it and can be the mother of the world. I don't know its name, it is called **‘**Dao**’**……, Man obeys the Earth, the Earth obeys Heaven, Heaven obeys Dao, Dao obeys Nature**”**. The regular way **“**Dao**”** of the Universe must also be revolved around without losing it; in other word, the regular way of the Universe must be revolved around to be able to fit in and should not form an icy world that is forever dead, so scientists' presumption needs to be studied further.

On the other hand, according to the Big Bang Theory, dark energy will decrease gradually down, but total matter increases gradually up, when dark energy density decreases to below 50% or less, and total matter density increases to bigger than 50% or more, the Universe may stop to expand, and turn around to collapse in a **“**Big Crunch**”** due to the gravity.

11. CONCLUSION

After studying the existence of a dark planet, which locates in the interior of the Earth but in another cosmos than ours that should be served as a proof of the existence of the dark matter and may be able to confirmed the multiverse. Based on the applications of ten-dimensional space-time of original String Theory and combining with Anthropic Principle and Causality, a 3-cosmic framework of the Universe is developed, i.e., triple cosmoses in the Universe, which can interpret the problems of dark matter and dark energy including the accelerating expansion of the Universe that should enable a new approach to breaking the bottleneck of research in the space of the Universe, but still needs to be proved by the fine outcomes of physicists' new research.

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