Dark Matter and Dark Energy can be revealed from the 10-dimensional spacetime of String Theory

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Based on String theory, there is a 3-cosmic framework of the Universe, which has triple cosmoses in the whole of space that can find a dark planet, which is about 1.33 times the mass of Mars, located inside the Earth, but in the other cosmos than ours. Based on the data of the cosmological parameters from 1-year WMAP to Planck satellite 2018, it can be speculated that the current dark energy should be taken as the residual energy of the Universe after the Big Ban. Due to the rapid expansion of other high-energy-density cosmoses, its dark matter should exert a gravitational drag on the stars of our low-energy-density cosmos that causes the effect of accelerating the expansion of our cosmos.

In 1922, Jacobus Kapteyn the first astronomer addressed the possible existence of invisible matter in the Milky Way Galaxy by using stellar velocities, then many scientists found unobservable matter, which was called “dark matter”, amounted to more than 90 % mass of the entire Universe. The dark matter is real that can only be detected by its gravitational influence on visible matter. While almost all astronomers agree on the existence of the dark matter; however, after one hundred years of search, there is nothing gained.

In 1990s, the astronomers of two research teams observed type 1a supernova, and the two independent projects simultaneously came to the same conclusion: a completely unexpected acceleration in the expansion of the Universe. Their discovery led to the idea of an expansion force, dubbed “dark energy”. Dark energy is a current scientific hypothesis, being neither matter nor radiation, and its physical properties have no clue.

In 2014, after the Planck satellite observed the cosmic microwave background radiation, scientists deduced that the Universe is composed of about 5% of normal matter, such as planets, stars, asteroids, and gases, etc., the remaining 95% is dark matter and dark energy, of which dark matter that does not radiate or absorb light accounts for about 27%, and dark energy accounts for about 68%. 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.

To solve the problems of dark matter and dark energy, some cosmologists accept the type of multiverse today. Based on original String theory, the constitution of the Universe is nine-dimensional space and one-dimensional time, called 10-dimensional spacetime theory, and we apply “Anthropic Principle” and “Causality” to deal with space and time of the Universe. According to “Causality”, an effect cannot occur before its cause, which means time has one way 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.

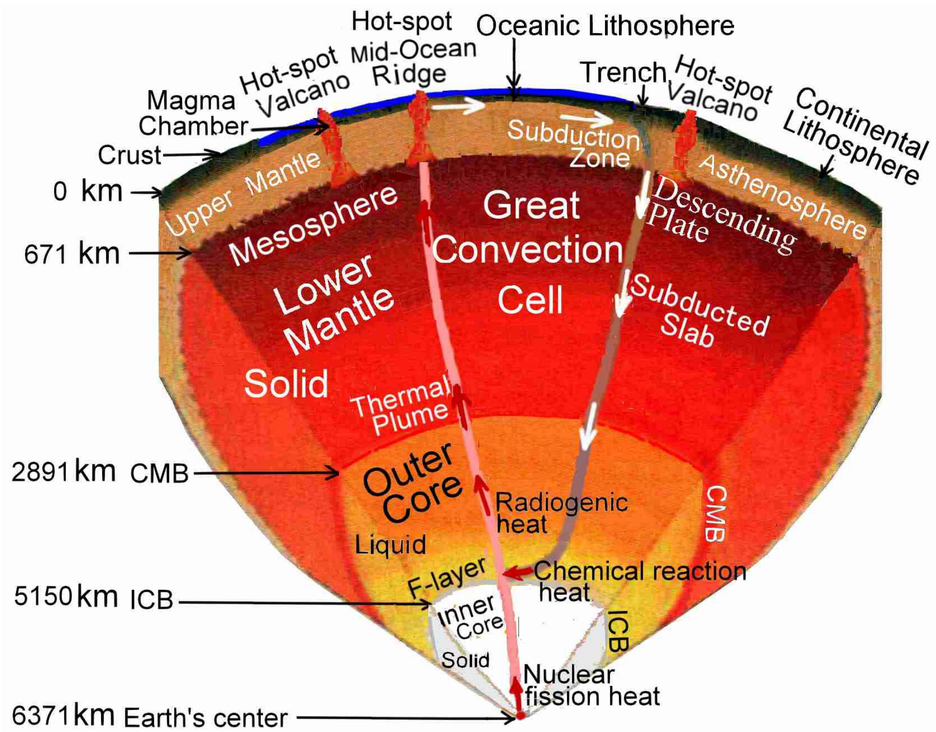
According to “Anthropic Principle”, which is the simple fact that we live in a Universe set up to allow our existence. It means that three-dimensional space and one-dimensional time are taken as one cosmos as our living world. Therefore, the nine-dimensional space can be divided into three portions, and each portion has a common standard time, which means there is a 3-cosmic framework of the Universe, i.e., three cosmoses locate in the same nine-dimensional space of the Universe. A 3-cosmic framework of the Universe has characteristics in which our cosmos describes the world of general matter as we know, but the others describe the worlds, which we know nothing about.

According to the String Theory, there is no basic interactive forces of nature except gravity among any other cosmoses, i.e., the graviton in the field of gravity can penetrate all the cosmoses; however, the light (electromagnetic wave) cannot penetrate directly with each other among the cosmoses. So, the matter in other cosmoses we cannot observe that should be our dark matter, i.e., the 3-cosmic framework of the Universe can hold dark matter. The best method of 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, temperature, pressure, and the density distribution of the Earth, some scientists analyze several data of the Earth's interior from a different view of the core, then the special arguments are put forward. As a result of the study, we can infer that the solid rock in the lower mantle and the liquid molten rock or magma in the outer core change states interactively and the curve of density distribution is continuous at the core-mantle boundary (CMB).

In the low viscosity F-layer of the outer core, the high temperature causes some elements, and the components to undergo oxidation-reduction reactions with each other and separate due to the effects of gravity. The abundant iron oxides are partially reduced to iron, which alloys with certain amounts of nickel, and also combines with a great amount of oxides to settle down in the inner core and solidify.

The great amount of heats, produced from chemical reaction heat, radiogenic heat and nuclear fission heat, become the power sources for the geo-dynamo of great convection cell, which are the flows of magma or solid rock migrating up to the crust and down across the CMB to the F-layer of outer core.



A schematic diagram of a great convection cell and heat flow, and the constituent of Earth's interior.

Based on the conception, we apply the different density distribution curves of the model in the core to calculate the data of Earth and compare it with the existing current data, and then the Earth's mass and moment of inertia are found to be only 85.73％ and 94.82％ respectively of current data. The insufficient mass and moment of inertia belong to the missing matter which are taken as the parts of dark matter. Formulating the reasonable assumptions, dark matter inside the Earth has been figured out, then calculate gravity and pressure in every depth within the Earth to check suitability. Finally, a planet of dark matter, called dark planet, with a radius of 3700.375 km, about 1.33 times that of Mars, has been calculated inside the Earth in the other space than ours. The existence of the dark planet should be confirmed from Chandler wobble[1]. From this research, the problem of dark matter should be solved.

To research dark energy, we apply the eight data of cosmological parameters of Wilkinson Microwave Anisotropy Probe (WMAP) results and Planck Satellite results from 2003 to 2018 for 15 years, to form a table of cosmological parameters of WMAP and Planck Satellite .

The Table of cosmological parameters of WMAP and Planck Satellite

Source / Symbol	WMAP 1-year	WMAP 3-year	WMAP 5-year	WMAP 7-year	WMAP 9-year	Planck Satellite 2013	Planck Satellite 2015	Planck Satellite 2018
H_o	71.0	70.4	70.5	70.2	70.0	68.14	67.31	67.32
Ω_Λ	73.22%	73.2%	72.6%	72.5%	72.1%	69.64%	68.5%	68.42%
Ω_m	26.78%	26.8%	27.3%	27.44%	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%
t_0	13.7Gyr	13.73 Gyr	13.72 Gyr	13.76 Gyr	13.74 Gyr	13.784 Gyr	13.80 Gyr	13.80 Gyr

After Big Bang, the Universe expands rapidly, the temperature drops, gradually cools down, then energy transforms into the building blocks of matter. In the table, the value of dark energy density Ω_Λ 73.22% from 1-year WMAP results to Planck Satellite 2018 results, decreases gradually down to 68.42%, decreasing 4.8%, but the value of total matter density Ω_m from 26.78 % increases gradually up to 31.58%, increasing 4.8%. The dark energy loss is equal to the increase of total matter that is consistent with "The Big Bang Theory".

Based on The Big Bang Theory, the full energy (100% energy) of the Universe at the first moments of Big Bang has gradually been converted into matter, and after 13.8 billion years at present, 31.58% has been converted to matter density Ω_m, and there remains energy density Ω_Λ 68.42%, which is called dark energy by physicists. Therefore, we should take the current dark energy as the residual energy of the Universe after Big Bang. Due to the current composition of the Universe, dark energy density Ω_Λ accounts for 68.42%, which is so much larger than the 31.58% of matter density Ω_m that the Universe can be seen still expanding rapidly.

According to the table, cold dark matter density Ω_c gradually increased from 22.34% to 26.64% that is an increase of 4.30%, and the baryon density Ω_b that makes up the Universe gradually increases from 4.4% to 4.94%, only by 0.54%, and the ratio of both is 8:1. Because matter transforms from energy after Big Bang, the baryon density increasing value is very small, which indicates energy in our cosmos is so poor that we can label ours as the low-energy-density cosmos. On the contrary, the matter in other cosmoses, i.e., dark matter for our cosmos, has an increase rate of 8 times, indicating that dark matter density in the other cosmoses has increased greatly, so we can label the others as the high-energy-density cosmoses.

Under the 3-cosmic framework of the Universe, the rate of expansion in the high-energy-density cosmoses will be much higher than that of a low-energy-density cosmos as ours. When the high-energy-density cosmoses expand, its dark matter will expand at the same pace that will use gravitational force to drag on the stars of our cosmos away at the same pace, the dragging effect of which causes us to observe that the stars in our cosmos are expanding at an accelerating rate[2]. From this research, the problem of dark energy should be solved.

After all, this is a problem of using a model based on an understanding of physics and the Universe that is about 95 percent incomplete, in terms of the nature of dark matter and dark energy. However, from the 3-cosmic framework of the Universe, the problems of dark matter and dark energy in astrophysics should be solved as above, then we'd probably have the standard model of the Universe, which can hold dark matter and dark energy[3].

REFERENCE

[1]. Ho, Hsien-Jung, 2019. Based on the Space-Time of String Theory Exploring Dark Matter inside the Earth, *Journal of Scientific and Engineering Research*, 2019, 6(8): 166-191. http://newidea.org.tw/pdf/S71.pdf.

[2]. Ho, Hsien-Jung, 2022. The 3-Cosmic Framework of the Universe Can Hold Dark Matter and Dark Energy, *Journal of Scientific and Engineering Research*, 2022, 9(4): 67-77. http://newidea.org.tw/pdf/S78.pdf.

[3]. Ho, Hsien-Jung, 2023. There is 3-Cosmic Framework in the Universe — Including Dark Matter and Dark Energy, *Newidea Research Center*, ISBN 978-986-86319-3-9, 15, April 2023. http://newidea.org.tw/pdf/S84.pdf.