

A FOUR-DIMENSIONAL MODEL, A GENERAL PRINCIPLE OF THE UNIVERSE

Dr. Zuoguang Wang

Beijing Anzhen Hospital, Capital Medical University; Beijing Institute of Heart,
Lung, Blood Vessel Diseases, Beijing, 100029, P.R.China.

ABSTRACT: *As it's known that the Universe is composed of matter, energy and space, etc. Both specific matters of natural science and consciousness are moving, changing and developing all the time. However, why are things moving, changing and developing all the time? How to recognize them? There isn't any theory which can explain this smoothly and convincing. In order to resolve these questions, we propose a four-dimensional model: Internal influencing factor - External influencing factor – Stable state maintaining system - Time model. In this model, internal influencing factor and external influencing factor are interference factors from internal and external of things respectively, while stable state maintaining system is a series of systematic factors maintaining the stable existence and stability of things themselves. As to time, it is only a necessary index for the depiction of moving, changing and developing of things. In a whole, the unbalanced integrative effect from external and/or internal influencing factors and stable state maintaining effect from stable state maintaining system determines the existence, moving, changing and developing of things at different time points. Therefore, this model is an epistemology as well as a methodology, which can depict and explain the existence, moving, changing and developing of all the things (including living organisms, abiotic matter, energy, and consciousness and social phenomena) in the Universe more accurately, systematically, and completely in form.*

KEYWORDS: internal influencing factor, external influencing factor, stable state maintaining system, time, re-cognitive model

INTRODUCTION

It's well known that the Universe, including all matter, energy and space, etc, are known or unknown by human being. Either appreciable matters in natural science or the special derivative of matters - consciousness in social science are moving, changing and developing all the time. Many theories, such as the Big Bang theory, the Theory of Relativity, the Quantum-mechanical Theory, the Yin-Yang Theory and the External / Internal Causes Theory, etc, have tried to explain this, and we have actually benefited a lot from these theories to some extent [1-4]. However, "Why are the things in the

Universe moving, changing and developing all the time?” and “How to recognize them closer and more authentic?” remain unresolved. In this paper, I propose a novel theoretical model which will help to resolve these questions and recognize things more comprehensively, accurately and timely in form.

The classification of things

As is known, matters in the Universe are mainly composed by living organisms, abiotic matter and energy (AME). Living organisms include human being, animals, plants, microorganisms, etc, while AME includes physical substance, fields, dark matters and energy (including thermal energy, electromagnetic energy and in particular dark energy), etc [5]. Beside matters, there is a special derivative of matters - consciousness. Consciousness can't exist alone and is considered as a unique feature of animals, particularly in human being. Human consciousness includes personal consciousness and social consciousness. Personal consciousness is the state or quality of awareness or of being aware of an external object or something within oneself. Social consciousness is consciousness shared by individuals within a society. According to Karl Marx, human beings enter into certain productive or economic relations and these relations lead to a form of social consciousness [6, 7].

Factors affecting things

Many factors can affect moving, changing and developing of things. The common ones include internal factors from things per se and external factors from outside of things, which are acknowledged by almost all the fields of academic world [8]. However, these two factors are difficult to clarify the mechanism of many phenomena, such as glass is fragile while iron isn't, heavy smokers are not always suffered from lung cancer even if they had similar lung cancer related genes mutation, etc. Therefore, I put forward a new factor, stable state maintaining factor, which plays a very important role in the moving, changing and developing of things. What's more, internal factor and external factor are renamed and discussed as bellow.

Internal influencing factor

Internal influencing factor (IIF) is defined here as factors produced in internal part of things which can interfere the stability of things themselves. IIF is different from the traditional internal factor which includes all of the things per se. IIF affects moving, changing and developing of living organisms or AME from internal of things. For example, deoxyribonucleic acid (DNA) spontaneous mutation in chromosome of human cells can affect the expression and function of related proteins, either positively or negatively, which may sequentially lead to diseases [9]. According to the Big Bang Theory and the Inflation Theory, the Universe was come from the conjectured

Big Bang singularity and expanded from a very high-density and high-temperature point. That's to say, the instable internal matter and energy generates and leads to the Big Bang [10]. Here, the instable matter and energy in the Universe is IIF for the Universe.

In human society, for a nation, IIF includes the style of culture and value orientation, the well-being index of the masses, the number of corrupt officials, and the strength of opposition parties etc, which decide the stability of the nation. For example, the sudden collapse of the Soviet Union in 1991 is mainly because of the bad economy combined with Gorbachev's hands-off approach to Soviet satellites, which are internal influencing reasons [11]. In individual consciousness field, interests, demands and desires are very important factors for the existence and stability of a person's consciousness to choose and read a book.

Therefore, IIFs are very important to things themselves. They can affect the stability of things internally. However, IIFs are not always existed except things are changed from the original existence state to some extent. What's more, IIF of one thing is external factor for its brother components except it is the smallest thing and can't be divided anymore. Therefore, in the final analysis, IIF is caused by external factors from outside of a target thing if it was divided out indefinitely (**Figure 1**).

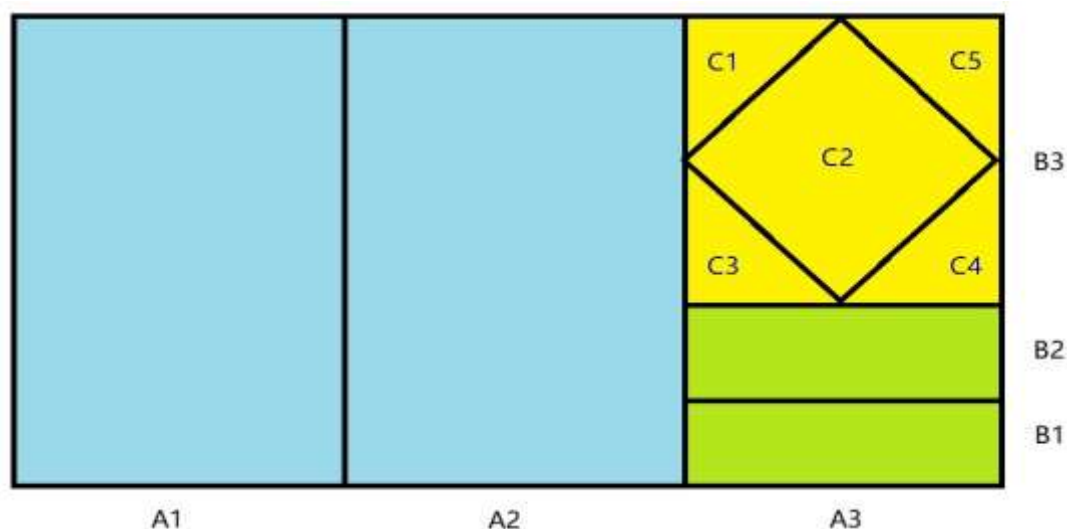


Figure 1. Internal influencing factor and external influencing factor for a target thing. As shown in the figure, one thing can be divided into three parts as A1, A2 and A3. They are internal influencing factors of the target thing, while they are external influencing factors each other. Next, A3 can be divided into three parts as B1, B2 and B3. They are internal influencing factors of A3, while they are external influencing factors each other. As for B3, it can be divided into five parts as C1, C2, C3, C4 and

C5. They are internal influencing factors of B3, while they are external influencing factors each other.

External influencing factor

Beside the IIFs noted above, there are some other factors which affect moving, changing and developing of living organisms and AME externally, including cold, heat, light, electricity, gravitation, mechanical pressure, tractive force, alkali, biological factors, etc. These factors are called external influencing factor (EIF). Although EIF isn't different from the traditional external factor in nature, EIF can reflect the effects of external things on a target thing more intuitively. In fact, all the factors other than things themselves can directly or indirectly affect the stability of things. Since more than one thing exist in the Universe, effects from external things are inevitable. For example, people are always affected by external things in environment, such as atmosphere, light, gravity, the Moon, and the Sun, etc. In social science field, EIF from environment is also very important. For example, the invasion is believed to be the main reason for the fall of the Roman Empire [12].

Generally speaking, EIF and IIF are relative. An EIF for one thing maybe an IIF for another one. For example, an atom of uranium is IIF for the total uranium block, while it is an EIF for other atoms of the same block. In addition, IIF and EIF are two basic interference factors for the stability of things, and they may be damaging or protective factor for the stability of things. That's to say, some IIFs or EIFs can help to maintain the stability of things, and can be called positive factors; while some other IIFs or EIFs can promote changing, moving and developing of things, and can be called negative factors.

As noted above, EIFs are existed all the time and IIFs may exist some times. Therefore, if EIF and/or IIF were the driving powers leading to moving, changing and developing of things and without any other protective powers, nothing can exist for a period of time. In fact, most of things can exist for a period of time and even for a long time. So, are there any other factors which can affect the existence and stability of things?

Stable state maintaining factor

As it's known, the Universe is composed of ordinary matter, energy, dark matter, dark energy, electromagnetic radiation (estimated to constitute from 0.005% to close to 0.01% of the total mass of the Universe), biology, consciousness, etc [13,14]. However, similar to the traditional internal factor and external factor, IIF and EIF can't explain the existence, moving, changing and developing of all the things smoothly too. Therefore, we can't help asking why and how these things can exist and maintain their special nature different from other things. The answer is that one more important factor has

never been under consideration during the Universe exploration. That's stable state maintaining factor (SSMF).

Definition of SSMF

Everything are consisted of some special components in special organized form. These are the base of things' existence. SSMFs also maintain the nature and stable original state of everything. Generally, the character of components and their organized form are named SSMF of things. Because SSMFs exist systematically without considering interference factors from internal or external of things, it also can be called stable state maintaining system (SSMS). Significantly, the traditional internal factor contains both SSMF and IIF discussed in this paper.

For living organisms, SSMS refers to the system maintaining the existence and stable state of the whole organisms themselves in a broad sense. In a narrow sense, SSMS refers to the system maintaining the existence and relative stable state of special physiological demands (homeostasis) which are necessary for organisms to live [15]. For example, maintaining relative stable state of body temperature, light, pH, ion concentration, etc at normal range is very important for the existence and normal function of living organisms. Under an ideal condition without internal or external interference factors, SSMS is the only factor which maintains the homeostasis of things, though it may be interfered by internal or external influencing factors in real world.

As to AME, anything, including energy, field and other matters, are in a stable equilibrium state if they weren't affected by any internal or external influencing factors. The factors which maintain the existence and stable equilibrium state of things also are SSMF. For example, the molecules and intermolecular power (including ion-induced dipole forces, ion-dipole forces and van der Waals forces) maintain the existence and nature of AME if they were not changed by IIF or EIF [16].

In social science field of consciousness, SSMFs, including people, power structure, police/military forces, law, regulatory and institutional framework, etc, are not only components of a nation itself, but also very critical to the existence and stability maintaining of a nation [17]. In individual consciousness field, SSMFs, including individuality, interests, demands, emotions and desires, etc, are both components and very critical to the existence and stability maintaining of a person's consciousness.

The necessity of distinguishing SSMF from IIF

For a long time, only internal factor and external factor are distinguished in the study of moving, developing and changing of things. SSMF was firstly put forward and used only for biological homeostasis in life sciences, and isn't extracted from internal factor and never used in matter world [18]. Since SSMF is really different from the traditional

internal factor anyway, I extract SSMF from the traditional internal factor which is renamed as internal influencing factor for accuracy. The potential reasons why SSMF is distinguished from the traditional internal factor are as following:

(1) **Different in composition Generally**, SSMF is always composed systematically by several or more parts (components) of things. SSMF maintains the existence and stable state of things all the time. The more complicate one thing is composed of, the more complicate the SSMF is. However, IIF is always one or several factors which can affect a target thing internally. For example, BP of human being is maintained by SSMF, including sympathetic nervous system, rennin-angiotensin-aldosterone system (RAAS), bradykinin system and endothelia system, etc, which are identified to be involved of hundreds of genes and proteins as well as many small molecules [19]. However, only one or several BP related genes mutated and limited small molecules involved during the establishment of high blood pressure. In fact, IIF is always weaker than SSMF. On that condition, we can observe the existence and process of things' moving, changing and developing. Therefore, the traditional internal factor includes SSMF and IIF and is obviously different from SSMF and IIF.

(2) **Different in function** Although SSMF is similar to the traditional internal factor by involved of the composition of a thing itself, it is completely different from traditional internal factor in nature. As to IIF, advantageous or disadvantageous, can interfere and affect the nature and original state of a thing itself, while SSMFs are born to maintain the physical, chemical or biological stable state of the thing itself [20]. For example, stability of blood pressure (BP) is maintained by sympathetic nervous system, RAAS, endothelia system, etc, which are called SSMFs of BP. A mutation of mitofusin 2 gene can lead to increase of BP, while SSMS will be activated to maintain the stability of BP [21].

(3) **Passiveness** IIF is caused for some reasons and is a kind of active interference factors affecting the stability of things at different part, at different degree and at different time, while SSMS is activated passively and depends on the quantity and degree of the interference factor caused by IIF and/or EIF [22]. For example, SSMS maintains stable state of BP actively, and will acts as a passive response for mitofusin 2 gene mutation and related BP changes. Therefore, activation of SSMS is passive, while IIF is active.

(4) **Hysteresis** IIF can act on things and affect the nature and stability of things. Then, things will response to the effects (interference) through SSMS. Because the activation and response of SSMS depends on the effects from IIF and/or EIF, it comes into being later than the IIF and/or EIF [23].

(5) **Different in determinant** It seemed that IIFs are always randomly appeared and

can't be predicted on non-experimental condition, while SSMS is decided by the nature of thing itself and can be predicted in advance [24]. For example, we almost know all the mechanism for the factors maintaining the stable state of BP, but we may never know which gene will mutate and lead to increase of BP for a person on non-experimental condition.

(6) **Self-organization** SSMS is a kind of self-organization system which is typically robust and able to survive and even can self-repair substantial damage or interferences [25]. SSMS is doomed in nature or inherited. Like all self-organization systems, SSMS occurs in a variety of physical and chemical matters, living organism, social phenomena as well as cognitive system. Crystallization, spontaneous magnetization, thermal convection of fluids, molecular self-assembly, and animal swarming, etc, are typical self-organization system [26]. Li X et al reported that the adsorption behaviors of uranium atoms on coated graphene abide by self-organization principles [27]. However, IIF, being doomed in nature, inherited or seemed randomly, is only one or several unsystematic components of one thing itself. For example, it seemed that DNA mutation in human chromosome always appeared randomly or inherited on some special locus, while SSMS for DNA damage and repair is inherited, and is a collection of systematic processes by which a cell identifies and corrects damage to the DNA molecules in its genome [28].

Therefore, SSMS is completely different from IIF and EIF. SSMS is born for maintaining the stable state and the basic nature of things themselves. It's systematic, stable and self-organized. The establishment of SSMS depends on genetics for living organisms, components and organized pattern for AME, and character and social role of people for social phenomena. The stronger the SSMS is, the more stable the thing is.

Time factor

Time, as it is defined in the Wikipedia, is the indefinite continued progress of existence and events that occur in apparently irreversible succession from the past through the present to the future [29].

It's well known that everything is moving, changing and developing all the time [30]. Time is inextricably associated with moving, changing and developing of things, and it is also completely different from any other factors used for describing the state of things. In fact, if everything were in stationary state and didn't move, change and develop anymore, the existence of time is meaningless. What's more, how to measure time lapse? Therefore, time is an index defined and applied by human being, and is indispensable for the description and research of moving, changing and developing of things in the Universe or other universe, if it had.

Theory of the four-dimensional model

As discussed above, the well-known IIF and EIF are two kinds of very common factors. However, they don't necessarily lead to moving, changing and developing of things. For example, same DNA mutation and/or environment interfere can't lead to similar disease in human being. Why? That's because the effect of SSMS, a more important factor, is not considered. In order to well explain this and all the other phenomena, according to the factors noted above, I put forward a four-dimensional model: **External influencing factor - Internal influencing factor - Stable state maintaining system - Time factor** model, to depict the existence, moving, changing and developing of things in form.

In this model, EIF is the factor from external of things, and IIF is the factor from internal of things, while SSMS is a system factors decided by things in nature and is born for maintaining the stability of things. As shown below, the integrative effect from EIF, IIF and SSMS decides the state of existence, moving, changing and developing of things at a time point (**Figure 2**). Here, N_{IIF} means the negative effect from IIF, N_{EIF} means the negative effect from EIF, P_{IIF} means the positive effect from IIF, and P_{EIF} means the positive effect from EIF. Negative effect means the effect can promote the moving, changing and developing of a target thing. "N" is put in for negative values. Positive effect means the effects can maintain the stable state of a target thing and defend its moving, changing and developing. "P" is put in for positive values. Therefore,

If $N_{IIF}+N_{EIF}>SSMS+P_{IIF}+P_{EIF}$, then things can't maintain their original nature or state and will move, change or develop significantly. Accordingly, the nature or state of things will be altered.

If $N_{IIF}+N_{EIF}=SSMS+P_{IIF}+P_{EIF}$, then things are in a provisionally relatively stable state and won't move, change or develop significantly. However, any more effect from IIF, EIF and/or SSMS will lead to an unstable state of things and subsequently lead to moving, changing and developing of things significantly, or maintain their relative stable nature or state.

If $N_{IIF}+N_{EIF}<SSMS+P_{IIF}+P_{EIF}$, then things can maintain their original nature or state and won't move, change or develop significantly, although they are changed to some extent.

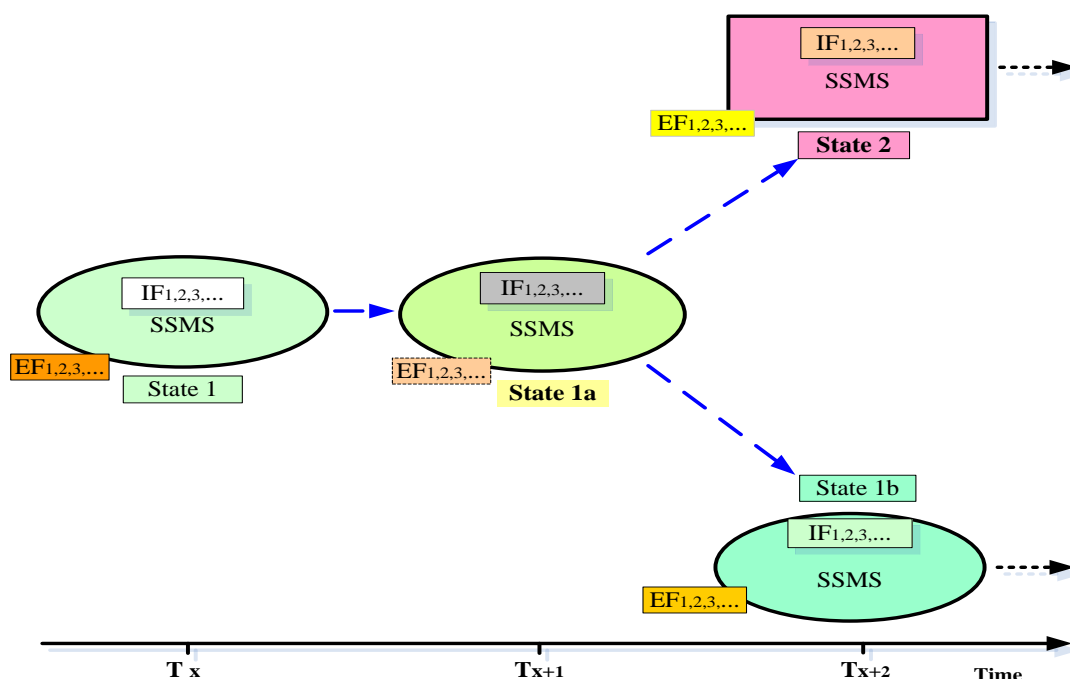


Figure 2. Schematic diagram of the existence, moving, changing and developing of things in a four-dimensional model. As shown in Figure 2, the integrative effect of IIF, EIF and SSMS decides the state of things at one time point (T_x , State 1). With time goes on, if the integrative interfere effect from IIF and EIF is gradually increase and equal to SSMS, things get into an unstable and critical state (T_{x+1} , State 1a) and any changes of IIF, EIF or SSMS will lead to significant moving, changing and developing of the original nature or state of a target thing. Then, if the integrative interfere effect from IIF and EIF is a little stronger than SSMS, things will move, change and develop significantly and new things will be formed (T_{x+2} , State 2). If the integrative interfere effect from IIF and EIF is become a little weaker than SSMS, things will keep the original stable nature or state (T_{x+2} , State 1b), and will not move, change and develop significantly. In this way, all the things will exist, move, change and develop by recycling all the time. IIF: internal influencing factors; EF: external influencing factors; SSMS: stable state maintaining system; T: time.

In total, any factors from external and/or internal can affect the state and nature of things, either for a big-scale structure or a quantum, while SSMS will work hard to maintain the original state and nature of things. The integrative effect of IIF, EIF and SSMS decides the final result of things. This is a complex dynamic and spatiotemporal process. Sometime, we can't observe the change of state or nature of things, that's because the effect from $SSMS + P_{IIF} + P_{EIF}$ is too strong for the effects caused by $N_{IIF} + N_{EIF}$. When the change is too small or without a good way to observe a tiny change, it seemed that

things keep a stable state in a period of long time. In fact, because interfere effect from IIF and/or EIF are unavoidable and can accumulate, while SSMS is relative stable, this will lead to a stronger interference factor than SSMS sooner or later. At last, the moving, changing, and developing of things will be inevitable.

Significance of the four-dimensional model

As it was indicated above, all things in the Universe, including living organism, AME and consciousness are moving, changing and developing all the time in the four-dimensional model. Therefore, if we read the Universe in the four-dimensional model, what it will bring to us?

Firstly, for living organisms, birth, development and death as well as health or disease, are basic events during life span. interference factors (IIF and EIF) have been believed to be the causes of growth and development as well as health and disease, while SSMS, which maintains the stable state of things and at least as important as interference factors, is almost neglected. This leads to the difficulty during the explanation of growth and development, health and disease of living organism in form. However, the establishment of this four-dimensional model will bring great changes of research methodology and cognitive approach for development and death, definition of disease and health, as well as diagnosis, treatment and prevention of diseases in the study of living organisms. This will help us to unveil the mysteries of biology quickly and accurately.

Secondly, in the Universe, AME also exist, move and change in the four-dimensional model like living organisms. The result of the fight among the three kinds of factors (IIF, EIF and SSMS) decides the existence, moving, changing and developing of AME. This model can explain a lot of unexplained phenomena such as why a butterfly doesn't always bring the Butterfly Effect [31]. That's because SSMS of air and related matters counteract the effect. As to Heisenberg's uncertainty principle, that's because the SSMS of a particle (photon for example) is too small to counteract the effect arising from the observer (the Observer Effect) [32, 33]. A weak measurement in the measurement of quantum may prove this in another way [34]. Therefore, the four-dimensional model can lead to a great change in the study of AME too.

The third, in consciousness field, this model is also very useful. For example, how to keep a regime stable? Three factors, including EIF (such as other countries' interfere by economic or force power), IIF (such as the life level of its citizens) and SSMS (such as police and military) should be considered [35]. The integrative effect from the three factors decides if a regime can maintain a stable state or not. When combined with time factor, the recognition of how to establish a more stable regime will be more profound. This further supports the wide applicability of the four-dimensional model. In fact, this

model will also be very useful in individual consciousness field.

In total, the four-dimensional model is a primary principle for the existence, moving, changing, and developing of anything in the Universe. What's more, it is a primary cognitive method for human being to cope with everything which can help to explain all the worldwide problems. However, although everything, including the thing zero in the Universe, appear, exist, move, change and develop in this model, this model can't tell where the thing zero comes from.

CONCLUSION

In conclusion, IIF is from internal of things, and EIF is from external of things, while SSMS is contained in things Sache selbst. With time goes on, all the things in the Universe exist, move, change and develop because of the unbalanced integrative effect of IIF, EIF and SSMS according to the four-dimensional model. Therefore, this model is a general principle of the Universe. It will be helpful to recognize things more comprehensive, accurate and timely, as well as to understand and uncover the nature of the Universe easier than before.

Conflicts of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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