

## Theory of Motion of Matter on the Formation of Galaxy and Star

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### Abstract

The basic reason of motion of matter in space of nature is energy variation; Energy variation facilitates the motion of matter which will result in mass variation. Energy variation causes the mass and density of matter to change: one result is the decrease of mass; the other one is the increase of mass. The mutual conversion process of matter and energy is also the evolution process of celestial bodies. Relation of Theory of Motion of Matter is

$$\mathbf{m} = \mathbf{E} \frac{c^2 \approx 0 \cdot Q}{HS} \mathbf{F}.$$

During both galaxy's and star's primordial stages of formation, the combination of two matter systems with relative motion cause the variation of mass and density. The non-synchronized motion between matter flow systems of large-scale diffuse interstellar nebula in space, comparatively speaking, is relative motion, which is a kind of retardation effect. It can change the motion direction of diffuse matter into equidirectional rotary motion in a certain space, that is,  $C^2 \approx 0$ . Regional material whose relative motion first combines with other's will superimpose with the other material and become the primordial galaxy nebula' or primordial stellar nebula' central core area with an increased density. After the energy variation in relative motion, part of matter centralizes into center area with high density; counterforce of another part of matter radiates into outer space, thus forms relative motion with diffuse matter and changes the direction of diffuse matter's motion, which leads to movement to center area of interstellar nebula. This butterfly-effect variation mode is a basic mode of cosmic matter evolving into galaxy and star; is a basic rule to centralize diffuse matter to form celestial bodies. The dynamic energy of diffuse matter particles play a leading role in evolution process of cosmic matter, celestial bodies, which instead has nothing to do with universal gravitation. Two interstellar nebula systems of diffuse matter combine together during relative motion, and bring about a galaxy with barred spiral galaxy shape (Figure 2). Mutual effect of interior matter of one interstellar nebula system during the motion process forms a galaxy with eddy galaxy shape (Figure 1). Barred spiral galaxy evolves from the combination of xenomas, while eddy galaxy evolves from monomer. However, two matter flow systems of mainstream motion will occur during the process of galaxy formation, whether it is evolvement from allergenic' combination or from monomer. Two mainstream matter systems move relatively and mutual effect between matters in different spaces generates separate primordial stellar nebula with eddy shape. Among temporal, only the combination of relative motion of matter systems can result substantial change. Relative motion's compressing times is in proportional to density, but inversely proportional to volume. Galaxy's formation process is also the formation of primordial stellar nebula and star. Primordial galaxy nebula as well as primordial stellar nebula is a summated matter system, coming into being after the combination of matter system with relative motion during the process of evolvement,

that is,  $1_1 + 1_2 = \frac{(1_1 + 1_2)^n}{1}$ , and the process of large-scale cold and dark interstellar nebula evolving into galaxy

and star is just like creatures multiplying descendents; Only the combination of two matter can generate new individuals, which is a rule of matter variation in nature. The combination of animals and plants xenomas can generate many individuals; the combination of matter systems in large-scale cold and dark interstellar nebula forms many primordial galaxy nebulas, and primordial galaxy nebula evolves into many separate primordial stellar nebulas. Stars are basic celestial bodies in space. After diffuse matter in primordial galaxy centralizes into the center of respective separate primordial star, scorching mutual effect occurs between little part of surrounding matter and center nucleus substance, which bombard the energy level to rise just like thunder, and to cause nuclear reaction giving birth to stars.

## 1. Theoretical Analysis

### 1. The Relationship between Matter and Energy Finds Theory of Motion of Matter.

Matter in nature shows two forms of existence: that is, matter and energy; Matter is materialization of energy with certain density and mass in relative static state; Energy is dynamic manifestation of numerous material particles, (Note: In order to discuss the variation rule of cosmic matter more reasonably, the notion of words about “energy” in this text is different from former meaning of “energy”. Besides, there might be some misnomers, please give your priority to the main idea.) And it is energy of matter; while energy variation is the variation of mass and density which results from the relative motion and mutual effect of numerous material particles. Energy variation has the same meaning with matter variation. Primordial galaxy nebula evolving into primordial stellar nebula is the result of energy variation. There are two contrary variation modes of matter in nature, which is a result caused by the mutual conversion process between energy and matter. The process of energy converting into matter is expressed as contraction and aggregation, and material particles tend to be ordering and move together. For example, during the process of diffuse galaxy nebula contracting into galaxy and star, matter and energy are conservational, which indicates that the total mass of primordial galaxy nebula and primordial stellar nebula do not change. Diffuse matter (energized matter) taking main mass of nebula, moves into nebula’s central nuclear area with high density, thus the mass of which keeps increasing by  $m^+$ , and energy converts into matter ( $E \rightarrow F$ ) during the process of energy variation. The process of energy converting into matter is the process of material particles going dynamic balance, which is certainly the formation process of galaxy and star, too. That is the change of matter and the change of mass and density in our life all rely on work on energy force to make motion of matter centralize together, such as cars and ships or other transportation tools. The growth of living body is also the centralization of material particles which will increase the mass; it is variational action of energy quantification. Essential root of pedestrian flow or car flow centralizing to urban core is energy variation. There are enter and out, which is relative motion between matters. Motion of matter and mass variation are generated from energy force’ work, and formation and evolution of celestial bodies of cosmic matter are by the same token. The attracted matter with small mass is interfered by energy wave radiation of matter with large mass, and then alters the direction of motion of elementary particles in atoms of matter with small mass, which makes material particles in matter with small mass generally move into matter with large mass. This is essential reason of gravitation phenomenon.

Diffuse material particles’ interaction makes the energy level increase, thereby the energy variation occurs. Matter’s mass and density change; during the reciprocal transformation process of energy and matter, matter moves from one space area to another space area, matter  $F$  and energy  $E$  pass through time  $H$  and spatial distance  $S$  during the mutual conversion process ; the final result of motion of matter is the variation of mass  $m$  and density  $Q$ . Motion of matter results from energy variation; end for end energy variation promotes motion of matter; the relative motion between matter systems is acceleration  $C^2$ , and relative motion can convert to revolution in the same direction  $C^2 \approx 0$ . The energy of diffuse matter convert to matter because of interaction and relative motion, while primordial galaxy nebula and primordial stellar nebula form galaxy and star under the effect of energy variation.

Radiation phenomenon is material particles moving into the same direction after energy variation, and even rate rectilinear motion without relative motion also is relatively static  $C^2 \approx 0$ . For example, in the photothermal radiation of stars, matter  $F$  converting to energy  $E$  is the extinction process of celestial bodies  $F \rightarrow E$ . The mass of star decreases by  $m^-$ , which is another mode of matter variation in nature; The matter that moves to one center area is more than matter with outward radiation movements, which is formation process of celestial bodies. The other way round is extinction process of celestial bodies. When diffuse matter of primordial galaxy nebula moves inward, the relative motion will occur between it and the matter moving outward. The matter moving outward prevents the matter moving to the center area of nebula, and separate primordial stellar nebula is generated in the outer space of nebula’s center area. Material particles under the photothermal radiation of stars gather into new galaxies and stars in cold and dark space which has bare galaxies and stars. Energy variation and matter variation are the reciprocal transformation of energy and matter, and the process of reciprocal transformation of energy and

matter is the movement of matter. The theory relation expression is

$$m^{\pm} = E \xleftrightarrow[H, S]{C^2 \approx 0 \cdot Q} F \quad \text{by analyzing}$$

the theory of motion of matter.

The essence of the theory of motion of matter and energy variation is variation of mass and density caused by interaction of relation motion between numerous material particles; Energy variation caused by the combination of two matter systems generates much respective separate matter  $1_1 + 1_2 = \frac{(1_1 + 1_2)^n}{1}$ , all of which are rules of cosmic matter variation.

## **2. Source of Cosmic Matter and the Root of Motion and Variation of Matter**

Matter released by stars in remote galaxy before the formation of original space moves into the space of original universe, and they cluster and evolve to galaxies and stars seen by us for the moment--This is the source of original cosmic matter. Matter can't generate without foundation, it can only moves from one space area to another space area. Matter radiations released by stars in group of galaxies move to the space without stars, and then converge together and make galaxy nebula. Cold and dark galaxy nebula (dark energy or dark matter) forms new galaxies and stars in conformity to cryophysics change rule. Living organisms rely on the materials provided by the surrounding environment, which are the cosmic materials in a broad sense. The formation and evolution of celestial bodies can be made an analogy with the manner of biological reproduction. The growth and reproduction of organisms are the manifestation of the variation of the cosmic matter.

Cosmic matter is in want of dynamic balance during the movement process of variation. But because of instability and inertial moving force effect of numerous diffuse matter particles, it can never reach absolute equilibrium, and it will move to contrary direction when it changes to ultimate; Energy converts to matter and matter converts to energy; spheroidal is the basic existing mode of matter's steady state. Stars are the basic celestial bodies in space, when diffuse matter evolve into primordial stellar nebula through primordial galaxy nebula, and the diffuse matter evolved into primordial stellar nebula almost all concentrate to the center of primordial stellar nebula, which means the cosmic matter develop to ultimate; cosmic matter developing in an opposite way, primordial galaxies and primordial stars have eternal circulation with galaxies and stars in the evolving history of cosmic material. The effect of energy variation makes space matter move from one space area to another; Energy variation promotes motion of matter, and inertial motion force of numerous material particles excite the energy level to rise. According to the law of conservation of matter, there should be numerous matter systems of galaxy nebula, and they move to outer space far way with inertial motion force.

## **II. The Formation of Galaxy and Star**

### **1. Primordial Stellar Nebula Caused by the Evolution of Primordial Galaxy Nebula**

#### **① Causes of the Formation of Vortex Galaxy**

Large scale cold stark interstellar nebula in the space will disperse matter and produce perturbation in the process of motion variation. When the velocity of nebula internal matter motion is not in synchrony, it is referred to as a kind of relative motion, and matter with relative motion forms a kind of braking effect. The first combined area in relative motion will becomes center high density area of interstellar nebula with the increase of density. Matter system of high density area will prevent dispersed matter motion; in return, dispersed matter will promote the matter motion of high density area. Angular momentum of the relative motion among numerous material particles deflect and high density nuclear zone matter changes into S type, and this is the initial stage of the formation of vortex galaxy.

If there is no relative motion produced inside the internal space of nebula during the evolution process of primordial Milky Way Interstellar nebula; (according to the explanation of Theory of Gravitation) then, Milky Way Galaxy will not have been the current state, but a huge solid celestial body formed by the gathering of all material celestial bodies in Milky Way Galaxy. Only the energy change of relative motion among numerous material particles can produce material systems independent to each other. At the initial stage of the formation of galaxy, the distance between primordial stellar nebula and primordial stellar nebula in primordial galaxy nebula is not too far. After primordial Milky Way Interstellar nebula becomes vortex type interstellar nebula, energy change of relative motion interaction occurs within certain space region for internal dispersed matter occupies a relative large space with not very high density, and it produces numerous vortex type primordial stellar nebula independent to each other in nebula center area through the compressure of relative motion, that is to say that primordial galaxy nebula center high density nuclear zone is made up of numerous primordial stellar nebula.

As primordial galaxy nebula and primordial stellar nebula are vortex type, centrifugal effect makes dispersed matter unable to move rapidly towards nebula center. It produced relative motion between matter moving outwards primordial galaxy nebula center high density nuclear zone and dispersed matter, which has changed the motion direction of dispersed matter and made it move towards nebula center. Energy change occurs between primordial galaxy nebula center high density nuclear zone and dispersed matter, producing numerous vortex type primordial stellar nebulas there. Primordial stellar nebulas have constituted primordial spiral arms of primordial galaxy nebula and made spiral arms continuously spread towards outer space until all dispersed matter among primordial galaxy nebulas have been gathered into primordial stellar nebula. (Please see the graphics) Primordial stellar nebula moves towards the interior of primordial galaxy nebula at the inertial motion direction after it is formed and gradually stops moving with the inward motion of rotating centrifugal force of primordial galaxy nebula. As the density of primordial stellar nebula is far higher than that of primordial galaxy nebula, therefore all matter on the spiral arms of primordial stellar nebula is centralized into the center of primordial stellar nebula.

## ② Causes of the Formation of Barred Spiral Galaxy

The phenomenon of galaxies in groups is rather universal. Before forming galaxy, interstellar nebula should have lower density and larger volume; the distance between interstellar nebula and interstellar nebula should not be too far; the inner combination of relative motion permeated among interstellar nebula should be a universal phenomenon. When two material systems with relative motion are combined, the first intersecting area becomes the center nuclear zone of primordial galaxy nebula or primordial stellar star; the combination of two interstellar nebulas with relative motion has constituted the morphotropism of primordial galaxy nebula; the birth of primordial galaxy nebula is also accompanied by that of primordial stellar nebula. The compression effect of relative motion produces primordial stellar nebula independent to each other in the first combined area; primordial stellar nebulas have constituted high density center nuclear zone of barred spiral galaxy. (Please see the graphics) As the density of primordial stellar nebula is far higher than that of primordial galaxy nebula, the matter between matter in primordial stellar nebula high density center and dispersed matter is consecutive to each other; yet the density of primordial galaxy nebula is lower than that of primordial stellar nebula, at the initial stage of the formation of primordial galaxy nebula, dispersed matter is gathered in different spaces after matter energy change with relative motion interaction so as to split into numerous primordial stellar nebula independent to each other. First generated primordial stellar nebulas have constituted the high density center area of primordial galaxy nebula. Another part of matter with energy change radiates towards outer space outside the center of primordial galaxy nebula, and is combined with dispersed matter in outer space, producing new primordial stellar nebula in outer space of primordial galaxy nebula center high density area.

Matter energy with relative motion interaction changes; the rise and fall of energy stage is shown as the increase and decrease of activity of material particles; part of matter density will increase with the compressure after the rise of energy stage of relative motion and becomes center nuclear zone of primordial galaxy nebula or primordial stellar nebula; the matter in center nuclear zone of primordial stellar nebula spins as a whole, making energy stage fall back to “ground state”, namely  $C^2 \approx 0$ , conversion of energy:  $E \rightarrow F$ . After the formation of high density center nuclear zone, another part of matter radiates towards outer space of high density nuclear zone with counteracting force and makes relative motion with dispersed matter, changing the motion direction of dispersed matter and making dispersed matter move towards center direction of nebula, so as to make the material mass of energy stage center nuclear zone increase continuously. The strength generated by the relative motion of two material systems of interstellar nebula is a kind of inertial motoricity, and the compression of inertial motoricity has constituted barred spiral galaxy. Barred spiral galaxy is made by the horizontal compression of the relative motion of interstellar nebula, or maybe it is formed from the vertical extension towards two directions taking first combined high density area as the center; however, the two modes are undefined, still needing further research.

Energy change occurs between high density nuclear zone and dispersed matter where there is interaction force existing; energy change is the main cause to make dispersed matter centralized to form galaxy and star. During the process of the formation of galaxy and star, energy change is not necessarily presented by the form of photothermal radiation, but it must have conformed to low-temperature physical energy quantization behavior change; the phenomenon violating natural change law would not have possibly taken place, or the outward gas pressure of hyperthermia radiation must have had the whip hand and prevented the formation of celestial bodies; the presentation by the form of nuclear reaction photothermal radiation is the thing occurring at later stage of the stellar formation.

## **2. Star Formation and the Way of Birth**

Primordial galaxy nebula and primordial stellar nebula are under the function of rotating centrifugal force and energy change; outward movement matter and inward movement matter are conversed between nebula high density nuclear area and dispersed matter so as to form their primordial spiral arms and the spiral arms constantly extends to grow towards outer space. Dispersed matter cannot directly move towards nebula center but rather move through primordial spiral arms, therefore, primordial galaxy nebula and primordial stellar nebula are combined together with close range in the formation process of galaxy and star. They have homeostasis changes in low-temperature environment, environmental matter change behavior close to “absolute zero” completely following the low-temperature physics change law. Primordial stellar nebula is completely a superconductor. Presented by the ordering of energy quantization behavior, its “zero point energy” accounts dominant low order and it tends to be ordering among material particle. Because liquid hydrogen and liquid helium have the nature of hyper-flow and superconducting on “low-temperature condition”, material particle with energy change may quickly release local energy, only appearing as ordering non-friction movement between material particle and making nebula internal matter reach momentum balance homeostasis state instead of making matter s under high temperature condition barge about without order, for example, it will be difficult to see thunderbolt phenomena in snowy days of winter. Primordial galaxy nebula and primordial stellar nebula should have been always located at a lower constant temperature value in the formation process of galaxy and star, just as animals and plants should grow under a certain temperature value.

There exists interaction force between high density area of primordial galaxy nebula & primordial stellar nebula and dispersed matter, and most matter after energy change will focus on high density central nuclear area and fall back to “ground state” together with central nuclear area matter system overall spin energy level, while high density area matter keeps relative static state. Another part of matter after energy change moves toward nebula outer space produces relative motion with dispersed matter and changes dispersed matter’s direction of motion so as to move towards nebula center. Nebula center high density area has no simultaneous movement with dispersed matter, but they strive to have simultaneous movement under the role of energy change. Matter moving outwards nebula also moves inwards nebula, but compared with the matter moving inwards nebula with quick speed, a little part of the matter moving outwards cannot stand against much matter moving inwards. As a whole, the matter all moves inwards nebula. It is just because the matter moving outwards changes the direction of motion of dispersed matter that makes primordial galaxy nebula produce primordial stellar nebula independent to each other. (Please see graphics)

Primordial galaxy nebula and primordial stellar nebula are in the environment close to “absolute zero”; therefore, their change behavior abides by low-temperature physics change behavior. Presented by energy quantization change behavior, it changes slowly at homeostasis state where dynamic state exists in static state as well as static state exists in dynamic state, tending to have same-direction ordering contraction change so as to make galaxy and star form smoothly. Dispersed matter continually joins in the areas passed by the primordial spiral arms of primordial galaxy nebula and primordial stellar nebula. Spiral arms continually extend and grow outwards outer space, and butterfly effect makes dispersed matter moving inwards nebula, so nebula shows contraction change as a whole. Spiral arms of primordial galaxy nebula consist of lots of vortex-like primordial stellar nebula, but the density of primordial stellar nebula is larger than that of primordial galaxy nebula, and primordial stellar nebula’s matter on spiral arms is continuous just like river continuously flowing into ocean, while dispersed matter such as cloud rain, ocean, river and cloud rain are connected together with structure similar to that of primordial stellar nebula, which embodies the change law of cosmic material. Its spiral arms are curved because of the rotating centrifugal effect of primordial stellar nebula.

Energy change is presented by low-temperature physics energy quantization changes behavior; dispersed matter won’t directly move towards nebula center but rather move through nebula primordial spiral arms; it is close combination among nebula matter without violent collision; hyper-flow and superconducting property determine the relative static state homeostasis contraction change of primordial galaxy nebula and primordial stellar nebula in the formation process of galaxy and star; classical physical theory isn’t applicable to explain the formation of galaxy and star. The formation process of galaxy and star is the process of energy converting to matter as well as the process of dispersed matter tending to dynamic balance;

When the dispersed matter in primary universe compresses its process step by step through primordial galaxy nebula and primordial stellar nebula, after most dispersed matter basically focuses on primordial stellar nebula center high density nuclear area, and when primordial stellar nebula develops to late stage, spherosome is the basic existence style of matter dynamic balance; Because it has a certain mass, the remaining small portion of dispersed matter's drag force intended for central nuclear area will decrease while its autorotation rate will increase, so that the velocity of movement of small portion of surround matter will be inconsistent with that of central area matter; there exists strong interaction force between them, and the increase of friction and impulse force results in disordering relative motion between matter particle; energy level's lifting and production are similar to thunderbolt-like bombardment, such way being used to ignite nuclear reaction fire, which symbolizes the birth of star. After the formation of star, cosmic matter develops to the ultimate; after the birth of star, matter radiating into space is more than the matter moving inwards. From the observations, newly formed star will spray a large amount of gaseous matter into space, which may well stimulate the outer surround matter of star nuclear reaction to be gasified and to move towards star outer space, forming planet and satellite in star outer space.

### III Conclusion

The change and development of comic matter result from the instability of large amounts of diffuse matter particles, which tend to obtain the dynamic equilibrium in the process of change and development. They will change in a form of relative motion and interaction between two matter systems once the equilibrium of particles does not exist. The change is a kind of energy variation which will result in the change of mass and density of matter. The energy variation is a kind of motion of matter, during which the inertial motions of lots of matter particles interact and excite the energy level to rise. Meanwhile, the change of energy accelerates the motion of matter, which transfers cosmic matter from a space region into another one. The evolution of diffuse matter in cold and dark space generates primordial galaxy nebula and primordial stellar nebula, while the aggregation of diffuse matter forms galaxy and star, and the density and mass of some space increase; after the formation of galaxy and star, the substance on the star radiate to space, thus the mass of substance decreases by  $m$ . Primordial stellar nebula and stars recycle in space. The Theory of Motion of Matter bears the same meaning with energy variation theory, and the process of intertransform between energy and matter is the evolution process of celestial body.

$$\overline{m^{\pm}} = E \begin{matrix} \xrightarrow{C^2 \approx 0 \cdot Q} \\ \xleftarrow{H \cdot S} \end{matrix} F$$

This formula contains the essence of the universe change.

If the diffuse interstellar nebula matter cannot reach a specific density, the matter particles will not reach a homeostasis state, thus they will change in a form of relative motion and interaction between matter systems. The result of energy variation is the occurrence of many separate matter systems. Both the evolution style of celestial body and biological reproduction of a new generation obey a specific law, namely  $1_1 + 1_2 = \frac{(1_1 + 1_2)^n}{1}$ .

The combination of two matters will produce a subtotal matter system which can bring about many separate matters. The relative motion of interstellar nebula matter system produces primordial galaxy nebula and primordial stellar nebula at the same time. Primordial stellar nebula changes until the whole diffuse matter in primordial galaxy are centralized into respective primordial stellar nebula centre, and then the galaxy will basically come into being. The formation of the star indicates the ultimate of the development of cosmic matter. The increasing energy level of impetuous interaction between a large number of diffuse matters and primordial stellar nebula centre matter leads to more matter radiating to space than matter collapsing into the interior star. The contraction of cold dark matter of the original universe generated the galaxies and fixed stars.

Contraction is the overall performance of the original universe. The form of universe transformed into expansion from shrinkage gradually after the birth of fix stars when most of substances concentrated to the original stellar nebula.

With the observation by a Hubble Space Telescope, Astronomers find that *The universe is still dilating rapidly at a much higher speed than what the Big Bang Theory thinks; some stars in the universe are even older than the universe, which is unimaginable, thus it can be deduced that either the traditional Big Bang Theory is wrong or the traditional galaxy and star formation theory needs to be reexamined.* If a new mode of the universe formation is deduced according to the Theory of Motion of Matter, then many problems on astronomy and cosmology may be explained more reasonably.

**References**

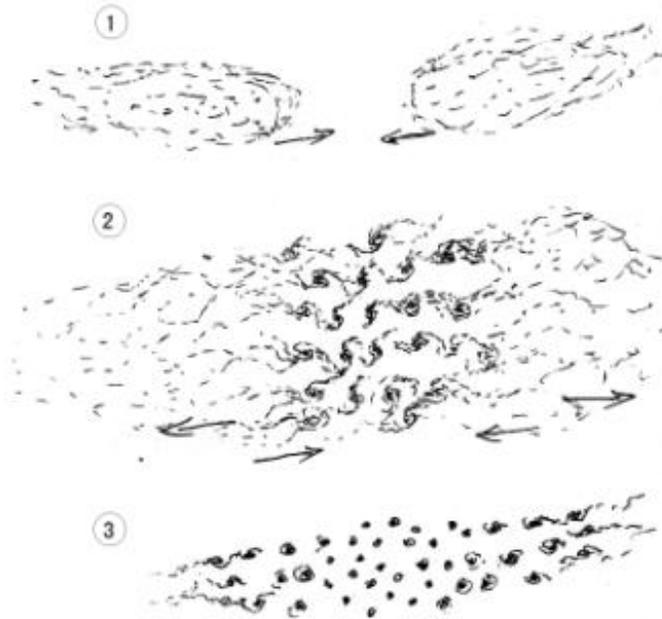
- (US) E. H. Wichmann, *Quantum Physics*, 1978
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**Formation Graphics of Galaxy and Star**

1. Cause of Formation of Spiral Galaxy



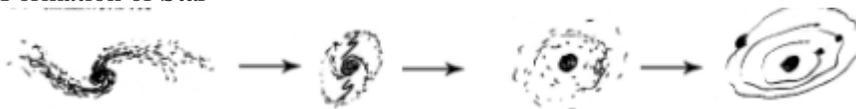
2. Cause of Formation of Barred Spiral Galaxy



Galaxy and Star's ways of formation and evolvement are similar to the living creature's producing offspring. The combination of two kinds of matter's relative movement can produce their own independent substance body, namely

$$l_1 + l_2 = \frac{(l_1 + l_2)^2}{1}$$

3. Formation of Star



The relative movement and interaction between matter systems is actually energy-change whose result is causing the changes on quality and density, and energy-change promotes the motion of matter, relational expression for

the theory of the motion of matter being  $m = E \frac{c^2 \approx 0 Q}{H S} F$ . After most diffuse matter in primordial stellar nebula has been centralized into the center of primordial stellar nebula, a small amount of surround matter has a severe interaction with center qualitative nuclear substances, just like the appearance of nuclear reaction and the birth of stars after energy level's lifting caused by thunderbolt-like bombardment.