The motion of celestial bodies complies with conservation of angular kinetic energy

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Abstract: Application of force accompany with energy consumption is the basic common sense. Based on this common sense, Newtonian mechanics system is studied according to energy transformation and conservation law. A concept of dissipation work is proposed and a calculation formula of dissipation work is derived. Meanwhile, thermal effect of force is obtained through inference, kinetic energy theorem is amended, and supplements of angular kinetic energy theorem and the law of conservation of angular kinetic energy are made. Through these researches, celestial body movement is found to comply with conservation of angular kinetic energy, rather than the conservation of angular momentum or the so-called conservation of mechanical energy. Also, the potential energy, which is superfluous in Newtonian mechanics, is found not to be energy. Therefore, the unity of conservative forces and non-conservative forces is realized. The revised Newtonian mechanics will have a profound influence on subjects and relative research fields of physics, astronomy and astronautics.

Keywords: dissipation work; kinetic energy theorem; angular kinetic energy theorem; the law of conservation of angular kinetic energy

1 The introduction

The establishment of the Newtonian mechanics system is based on the inference of Newton's first law. There are some inadequacies of establishments of Newton's second law, the momentum theorem, the kinetic energy theorem, angular momentum theorem and the law of conservation of angular momentum. Only motion laws and energy conversion laws of objects under the action of force are studied. Because objects under the action of force are objects which apply force as well, they have an influence on their self-motion caused by energy consumption under the action of force. Therefore, Newtonian mechanics is not universal. It is applicable for the low speed motion of short time but not for low speed motion of long time. Can it bring new discoveries and new applications to the relevant field by exploring the reason and providing the solution?

2 Logics and Shortages of Newtonian Mechanics

2.1 Planar motion laws of objects (particles) under the action of no force (balance force)

Newton's first law: V is equal to 0 or will not change.

Momentum conservation law: mV is equal to 0 or will not change.

Kinetic energy conservation law: $1/2m\ V^2$ is equal to 0 or will not change.

2.2 Planar motion laws of objects (particles) under the action of non- balance force

Newton's second law: F = ma.

Momentum Theorem: Fdt = dP = mdV

Kinetic energy theorem: Fds = dE

2.3 Rotation laws of objects under the action of non-balance force

Angular momentum theorem: dL = Mdt (L = r × mV, M = r × F).

The law of conservation of angular momentum: When M = 0, dL = 0 and L will not change.

Angular kinetic energy theorem: rFds = rdE (rFds is moment of mechanical work and rdE is variable quantity of angular kinetic energy).

The law of conservation of angular kinetic energy: when the Fds = 0, rdE = 0 and angular kinetic energy *rE* will not change.

There is no problem for the above derivations in the mathematical logic. However, why we cannot find the law of conservation of kinetic energy, angular kinetic energy theorem and the law of conservation of angular kinetic energy, but the principle of work and power and the law of conservation of mechanical energy appear? In which aspects does it have a problem?

3 The reason why the Newtonian mechanics has some shortages

3.1 Reason one: energy consumption under the action of force described by mechanical work is not comprehensive

For example: barbell lifted by weightlifting athletes stays in the air; iron is stationary attracted by electromagnet. Despite continuous energy consumption during the process of force application, no work is acknowledged in physics. Why is there such a "thankless" phenomenon?

3.2 Reason two: It did not study the objects under the action of force, which are the objects that apply force. Is there an impact for the objects which apply force to their self-motion?

3.3 Reason Three: expansion of thinking of Inertia motion

Rotational objects is under the action of non-balance force and do not fully meet the

preconditions of inertial motion. Therefore, when the law of conservation of angular momentum is used to interpret celestial body movement, there will be some problems, such as "first impetus" and "where does the tangential force come from in celestial body movement?" Also, this thinking of Inertia motion has an influence on the cognition of vibration and fluctuation.

3.4 Reason four: potential energy is inaccurately considered as energy

Potential energy can work or transform into kinetic energy. Why is potential energy not the true energy?

For example: $mgh=1/2mV^2$ in the free-fall motion; there are two explanations for this formula. One is the gravitational potential energy is transformed into kinetic energy; the other is gravity which does positive work results in the increase of kinetic energy.

The differences between the two explanations are: the former shows the kinetic energy of an object is obtained from the transformation of energy from the object itself, the latter shows the kinetic energy of an object is obtained from the transformation of energy from gravitational field (or the Earth); the former is a phenomenon, the latter reveals the essence. Weightlifting is prepared as a necessary condition for gravity to do work.

Free-fall motion (vertically upward projectile motion) or horizontal motion of objects is planar motion. It complies with Newton's second law, the momentum theorem and the kinetic energy theorem. For vertically upward projectile motion, the gravity does negative work with the reduction of kinetic energy, which transform to thermal energy. The forces have the same action effects. There is no distinction between conservative and non-conservative forces and no argument of the increase or decrease of potential energy. *mgh* and *mas* are either mechanical work or the moment (force multiplies distance, reflects the work did by the objects which apply force to the objects under the action of force, i.e., the consumed energy cause by the objects which apply force). Elastic potential energy is no exception; it is the sum of variable quantity of moments between the molecules. The conservative force just always exists. If there is no gravity, it is impossible for the objects to move downward with obtaining kinetic energy from an extremely high position. In order to obtain the kinetic energy, there must be an object to do work.

If we do not know where the kinetic energy of the object is transformed from and where it will transform to, it is impossible to find the motion laws of objects in nature, not to mention the problem of unity for macro and micro. The principle of work and power and the law of

conservation of mechanical energy are redundant and will act as a misleading role.

4 Supplements and amendments for Newtonian mechanics

4.1 Supplements of dissipation work $W = CF^2t$ and thermal effect of force $Q = CF^2t$

$W=CF^2t$ is named as dissipation work. It is the consumed energy required to keep the degree of deformation and it is proportional to the square of force and the force duration. For the constant *C*, it is needed to be measured and validated. This article only introduces one measurement and verification method. If the degree of deformation of the object changes, or to say, the magnitude of the force changes, it will be a differential problem of the mechanical work and dissipation work. Based on the energy conservation law, the dissipation work is a thermal effect of force in essence, namely, $Q = CF^2t$. It is a ubiquitous natural phenomenon in mechanical system and the endothermic and exothermic are relative. $P = CF^2$ is the heating power of force.

The experimental verification method of $W=CF^2t$:

1. Energize the coil with direct current (dc);

2. Measure the voltage U_1 between two ends of the coil and the current I_1 in coil;

3. Put the coil into the uniform magnetic field and the coil is in the stationary state, then the voltage U_2 between two ends of the coil and the current I_2 in coil.

$U_2I_2-U_1I_1=CF^2$ and $F=BI_2L$. B is the magnetic field intensity; L is the total length of the coil and it has nothing to do with the direction of the force. The data should be repeatedly measured. (In order to explain the conservation of the energy in electromagnetism, magnetic resistance is introduced)

4.2 Correction of kinetic energy theorem

In my opinion, there is no problem for Newton's first law, the law of conservation of momentum and the law of conservation of kinetic energy. However, there are some problems for Newton's second law, momentum theorem, angular momentum theorem and the law of conservation of angular momentum. There is no research for the problem of energy consumption of anti-force. Based on energy conversion and conservation laws, kinetic energy theorem is amended.

The revised kinetic energy theorem: $F_1ds- CF^2_2dt =dE$.

The physical significance is: the increase of kinetic energy in object *d*E, is equal to the difference between the mechanical work F_1ds done by the resultant force acted on the object and

dissipation work CF^2_2dt (heat production caused by deformation part) done by the reactive force (resultant force) of objects.

F_1 and F_2 are active force and reactive force, respectively. They are all resultant force and will not change the kinetic energy of objects.

For example: an object subjected to a force of 10 N, is moved in the direction of the force for 10 m with a time of 10 s. How much the kinetic energy of the object will increase? How much is the total energy consumed by the object which applies force?

Mechanical work: $W = F_1ds = 100$ J

Dissipation work is approximately: $W = CF^2_2dt = 1$J. (Value of C is in SI units about 10^{-3}; its value should be confirmed according to experimental measurement)

Increase of kinetic energy: $dE = 99$ J.

The total energy consumption is approximately 101J. The dissipation work of active force F_1 and reactive force F_2 are equal; the total energy is conserved.

In other words, the total energy consumption is approximately 101J. However, it does mechanical work of 100J and the object under the action of force only obtains kinetic energy of 99J. Therefore, about 2 J of energy, is consumed by the active force F_1 and reactive F_2.

Through comparison, it could find that although the dissipation work is small, if the force is relatively large and the work time is long, the consume energy factor cannot be ignored, such as celestial motion and particle acceleration experiments.

Reasoning: When $F_1 = 0$, $F_2 = 0$ and $dE = 0$. The kinetic energy E of the object will remain unchanged and it could be called kinetic energy conservation law.

4.3 Supplements of angle kinetic energy theorem and angular kinetic energy conservation law

Rotational question is always not clearly studied in physics. It relates to many physical quantities, including of centripetal force, tangential force, momentum, kinetic energy, and turning radius. If any one of these physical quantities changes, others will change with it. However, the energy conversion and conservation laws must be obeyed.

Rotation, namely, curve motion, is the motion in which the move direction and the resultant force direction are not in the same straight line. No matter how many forces act on the object, resultant force is used to study rotation to simplify the problem. Then the rotational problem will

be analyzed according to the concrete conditions without the constraint of conservative force.

Based on the revised kinetic energy theorem, angle kinetic energy theorem is supplemented: $d(rF_1\cos\theta)- Cd(rF_2^2t) =d(rE)$

The physical significance is: The increment of angular kinetic energy of the object d(rE) is equal to the difference between mechanical work moment $d(rF_1\cos\theta)$ and dissipation work moment $Cd(rF_2^2t)$ done by active force and reactive force.

F_1 is the resultant force; its direction and the move direction of object are not in the same straight line. F_2 is the reactive force of F_1. θ is the angle between the rotational direction and the direction of resultant force which acts on the object.

Discussion: When $\theta=0^\circ$ or 180°, rotational motion will transition to planar motion and angular kinetic energy theorem will transition to kinetic energy theorem. When $\theta = 90^\circ$, rotational motion is circular motion and F_1 will not do mechanical work. When $0^\circ <\theta <90^\circ$, $F_1\cos\theta> 0$ and it does positive work; when $90^\circ <\theta <180^\circ$, $F_1\cos\theta <0$ and it does negative work. The object motion will not be linear motion or circular motion.

Analysis: As an object which can be seen as particle, there are two cases under the action of force, including of balance force and non-balance force; also there are two cases when the object moves, including of linear motion (planar motion) and circular motion (rotational motion). Angular kinetic energy theorem is universal.

Supplements of law of conservation of angular kinetic energy: When $d(rF_1\cos\theta)= Cd(rF_2^2t)$, d (rE) = 0, i.e., rE remains unchanged.

Deduction: For all rotational objects, when no tangential force do mechanical work，namely $d(rF_1\cos90^\circ)=0$, the angle kinetic energy will gradually decrease, namely, $Cd(rF_2^2t) = -d(rE)$. (Concrete representations: planetary satellites crash, electrons fall into the nucleus and rotating objects will gradually stop the rotation.) This could be called the law of non-conservation of angular kinetic energy. To keep the conservation of angle kinetic energy of rotation objects, tangential force must do mechanical work.

Law of conservation of angular kinetic energy and law of non-conservation of angular kinetic energy are not contradictory. However, the preconditions of them are different. The verifications of law of conservation of angular kinetic energy and law of non-conservation of angular kinetic energy cannot be done in the Earth. The reason is simple for that the influence of friction

resistance cannot be eliminated.

5 The solar system is the test field

5.1 Celestial body movement complies with the angular kinetic energy conservation

In the solar system, when planets move to aphelion and perihelion, the centripetal force is equal to gravity. From $mv^2/r=GMm/r^2$, we can get $rmv^2=GMm$. Then $1/2rmv^2=1/2GMm$, i.e., $rE=1/2GMm$=constant. Also $rv^2=GM$=constant. From these two constants, what law can be found?

Based on $rE=1/2GMm$=constant, the equality of angular kinetic energy at the aphelion and perihelion is demonstrated. However, is the angular kinetic energy at other points equal? It could be proved through a simple reasoning. When the planet moves from aphelion to perihelion, although the kinetic energy continuously increases, the angular kinetic energy is conserved. If the angular kinetic energy increases or decreases, there will be an inflection point in the motion trails of planets and the angular kinetic energy at the aphelion and perihelion is impossible to be equal. Similarly, when the planet moves from perihelion to aphelion, the angular kinetic energy is conserved. Therefore, for the planets in the solar system which is in stable running, as long as the orbital periods of planets are the same, their angular kinetic energy is conserved. Also the relationship of $rE=1/2GMm$ is complied.

$rv^2=GM$=constant shows that rv (rv=?) and rP(rP=?) at perihelion and aphelion are unequal. It is proved that the planets orbit likes the shape of ducks egg. At the perihelion it is small head of ducks egg (small circular motion); at the aphelion it is the big head of ducks egg (large circular motion).

Newton's question "Where does the tangential force of the motion of celestial bodies come from?" shows that the law of conservation of angular momentum is problematic. The precondition of conservation of angular momentum is that turning moment or tangential force is zero. If the motion of celestial bodies is uniform circular motion, the law of conservation of angular momentum will be correct. Therefore, the law of conservation of angular momentum is not consistent with the law of natural motion.

If the motion orbit planet is simplified as circular motion, there will be: $rv^2\approx r(\omega r)^2=4\pi^2r^3/T^2\approx GM$ and $r^3/T^2\approx GM/(4\pi^2)$=constant. Compared with Kepler's third law, it can be found that Kepler's third law is an approximate case.

rv^2= GM is named the discriminant of conservation of angular kinetic energy; GM is Gaussian constant of the solar system. Similarly, if it is in compliance with the conditions of isotonicity and coplanarity, the space station will have a permanent characteristic based on rv^2= GM to locate the space station in compliance with the Direction in the Earth-Moon system. The sport life of space station can be comparable with that of the moon. (It is possible to be 100 years or 1000 years.)

rv^2= GM is not unfamiliar for physicists, astronomers, space scientists. The angular kinetic energy conservation is hidden in this formula. However, it is not discovered by researchers earlier.

I cannot prove if celestial rotation is compliant with conservation of mechanical energy. Because mechanical energy of planet at perihelion and aphelion is equal, it cannot be proved that celestial rotation is compliant with conservation of mechanical energy.

There should be angle theorem of kinetic energy and angular kinetic energy conservation laws to explain things corresponding with angular kinetic energy.

The discovery of conservation of angular kinetic energy proved the correctness of the thoughts of Newtonian mechanics once again. Based on Newton's shoulders, we can stand higher and see farther.

5.2 Interpretation of celestial body rotation based on angular kinetic energy conservation law

Precondition of conservation of angular kinetic energy: $d(rF_1\cos\theta)-Cd(rF_2^2t)=0$ or $d(F_1\cos\theta)- Cd(F_2^2t)=0$. F_1 is the resultant force which acts on the planet, i.e., the universal gravitation which acts on the planet by the sun; F_2 is the reactive force of F_1. F_1 cannot be eliminated due to $F_1=F_2$, otherwise, the authentic physical significance will be lost.

There is an example of a planet which has a complete revolution. Assume: angle kinetic energy of the planet at aphelion and angle kinetic energy of the planet at perihelion are r_1E_1 and r_2E_2, respectively; $r_1E_1= r_2E_2$. Because $r_1> r_2$, $E_1<E_2$.

When the planet moves from aphelion to perihelion, $\theta < 90º$. Gravitation $F_1\cos\theta$ do positive work W_1 and F_2 do dissipation work W_2 (equivalent to negative work). The kinetic energy of planet increases, i.e., $W_1-W_2 = E_2- E_1$--- --- (1).

When the planet moves from perihelion to aphelion, $\theta> 90º$. Gravitational $F_1\cos\theta$ do negative work W_3 and F_2 still do dissipation work W_4. The kinetic energy of planet decreases, i.e.,

$W_3 + W_4 = E_2 - E_1$ ------ (2).

During the process of a complete revolution, from Equation (1) and Equation (2), the following equation is obtained: $W_1 - W_3 = W_2 + W_4$. The physical significance is: the different between the positive work done by gravitation and the negative work done by gravitation (or to say, the sum of the positive work and the negative work) is equal to dissipation work done by the reactive force during the process of a complete revolution, i.e., when $d(F_1 s\cos\theta) = Cd(F_2^2 t)$ or $d(rF_1 s\cos\theta) = Cd(rF_2^2 t)$ (characteristic of driving), the angular kinetic energy of planet is conserved.

The reason why the angular kinetic energy of the planet in the solar system is conserved is that the sun constantly do work to drive the planet (The positive work done by gravitation the must be greater than the negative work done by gravitation). The planet cannot do symmetric motion around the sun; the orbiting center of the planet around the sun does not coincide with the center of mass of the sun. The orbiting center of the planet changes constantly. Centripetal force is less than or equal to gravitation; gravitation can be decomposed into centripetal force ($F1\sin\theta$) and tangential force ($F_1\cos\theta$).

According to the angle kinetic energy conservation law, for celestial revolution and rotation (rotation of particle group), there must be that the positive work done by resultant force is greater than negative work done by resultant force. Then the angle kinetic energy of celestial revolution and rotation can be conserved to make celestial body move in good order and have a rule to follow.

Characteristic of driving: How to drive? My preliminary thought is: Only rotation objects which have planets orbiting around them or satellites; objects without rotation cannot have their own planets, satellite or sub-satellite. Even if celestial bodies are captured temporarily, their sport life is very limited. Centers of mass of rotation celestial bodies and centers of gravity change constantly; this is determined by the deformation of gravitation.

Star is the engine; as long as there is deformation under the action of the sun gravity and non-spherical symmetry recoil is formed, it can move and rotate. The celestial body with rotation is "crank" and gravity is "link"; the orbital period of planet is greater than the rotation period of star. If orbital period of planet is equal to or less than the rotation period of star, it is not consistent with condition of conservation of angular kinetic energy (characteristic of driving). The orbital period of satellite is greater than the orbital period of planet. (No matter high they are launched,

Synchronous satellites cannot be synchronous without the dynamic action.) Galaxy is a combination of sets of the engines and the rotation of galaxies is driven by tangential force. Each galaxy is a heat engine, which converts internal energy to kinetic energy and then converts kinetic energy into thermal energy. (Thermal energy is negative work and dissipation work done by gravitation and is converted through the consumption of kinetic energy. This is the essential difference from the law of conservation of mechanical energy conversion.) An independent galaxy is composed of two stars at least. Only the rotational torque is formed, the independent galaxy can have a stabilize rotation by the action of attraction and repulsion (for stars it is spherical rocket or solar wind).

Characteristic of isotonicity: The direction of satellite revolution should be consistent with the direction of planet rotation; the direction of planet revolution should be consistent with star rotation. There is no existence of reverse revolution or rotation along the polar direction. If any, their sport life is very limited.

Jupiter has four satellites with reverse revolution; it must be an illusion caused by apparent motion of predecessors. If they are temporary captured, it is understandable. Jupiter is very large and four satellites (Pasiphae, Sinope, Carme, Ananke) are on the edge. When we observe the motion of four satellites using the satellite ring of jupiter as a frame of reference, it is easily to see them have a reverse revolution. I think they have a prograde revolution and a slow angular velocity and linear velocity ($rv^2=GM$). However, this remains to be proved.

Characteristic of coplanarity: The satellite orbits are in the vicinity of the equatorial plane of the planet; the planet orbits are in the vicinity of the ecliptic plane or the equatorial plane. The faster the rotated speed of the rotation is, the stronger characteristic of driving the objects will have and it is more likely to be coplanar.

The orbit of Pluto is largely deviated from the ecliptic plane. Apparently, it is caused by the attraction of the celestial body outside. This celestial body or galaxy must be away from the vicinity of the ecliptic plane of the sun.

Characteristic of asymmetry: All the celestial bodies with revolution can only have asymmetry orbit motion of the shape of "duck egg", but not circular motion or elliptical motion. Perihelion is the small head of "duck egg" and aphelion is the big head of "duck egg". To ensure a complete revolution of celestial bodies, the positive work done by gravitation must be greater than

negative work done by gravitation. Then their angular kinetic energy can be conserved. The greater the force, the faster the rotate speed. Also the closer the circumference sports, the closer symmetry.

Because $rv^2 = GM$ = constant, it determines the orbit of "duck egg" is axisymmetric. However, $d\ (F_1 s\cos\theta) = Cd\ (F^2_2 t)$ or $d\ (rF_1 s\cos\theta) = Cd\ (rF^2_2 t)$ (characteristic of driving). It determines the orbit is asymmetric, i.e., the area swept by the radius vector r in the motion from aphelion to perihelion is slightly less than that from perihelion to aphelion. Symmetry and asymmetry are based on orbiting center as a reference. Also, the sun revolves around the Milky Way, is another reason for the asymmetry of the planetary orbit, and it has a drive to the planet revolution. Therefore, the perihelion and aphelion position of planet should have some regularity.

What kind of the polar equation form of symmetric "Duck egg" orbit is? How to use mathematical methods to deduce polar equation form of "duck egg" orbit from the equation of $rv^2 = GM$? Because "duck egg" shape is close to the actual situation, these question need to be solved by mathematical scientists.

For the four kinds of regularity above, characteristic of driving is the reason and characteristic of isotonicity, characteristic of coplanarity and characteristic of asymmetry are the inevitable results caused by it. If we say that the solar system is a "perpetual motion machine", which needs to consume energy, now the solar system is in a stage of relatively stable operation. The universe evolves; however, the basic laws of motion will never change.

Prophecy one: For the satellite with reverse revolution, no matter what the launching height is, their sport life is limited without dynamic action. The run duration can be calculated in the future. $Cd(rF_2^2 t) = -d(rE)$ (F_2 is centrifugal force; it is equal to gravitation). The theoretical value is greater than the actual value.

Prophecy two: No matter what the direction of motion is, the sport life of spacecraft (detector) is limited without dynamic action.

Prophecy three: For the two same satellites at the same height, which have the same angular velocity of revolution around the Earth, the sport life of satellite with prograde revolution is shorter than that with reverse revolution.

5.3 Interpretation of the celestial rotation based on angular kinetic energy conservation law

Why is the speed of rotational velocity of planet very fast? Why does the so-called

"synchronous rotation" phenomenon not occur? They have a common characteristic, which is that the magnetic field of rotational celestial body is very strong. Therefore, I preliminarily thought that the planet rotation is driven by the magnetic force of stars.

Because the sun rotation produces a magnetic field and the magnetic field does not rotate with the sun rotation, the rotation directions of the planets are the same. If the solar magnetic field is rotated with the rotation of the sun, the rotation directions of the planets are reversed.

How can the rotation be demonstrated through experiment? Simple approach: Seal a small ring magnet in the plastic hollow ball and put the hollow ball in a beaker filled of water to float. Fix the top and bottom of the hollow ball and it cannot move randomly. Put the beaker on the edge of the disc on the round table and let the disc rotate. If you hold a magnet with strong magnetism, you can let the float ball rotate with a prograde or reverse rotation. This is the action of the magnetic field. If there is a hollow magnetic sphere float in water, a wide range of rotation experiment can be demonstrated.

Does Venus have reversed rotation? It may also be a misunderstanding. If it is a temporary motion, it is understandable. Every time Venus is closest to the Earth, it is the same side of Venus facing the Earth (Baidu Encyclopedia statement of Venus). Therefore, I think there is no rotation for Venus. This is not a coincidence, i.e., one side of Venus always faces the sun. There is a revolution for Venus but no rotation. Because its magnetic field is weak, it does not rotate. (There is only one truth)

Why does Uranus have a lying down rotation? Because the magnetic axis of Uranus deviated from Globe center dramatically (very asymmetric), it leads to a great deviation for the direction of magnetic moment of rotation under the action of the sun. This is the reason why Uranus have a lying down rotation.

Moon, small satellites and small planets cannot rotate easily (I find that the moon motion cannot be called rotation when I cannot use magnetic force to explain synchronous rotation of the moon). The reason is that small celestial body has a weak magnetic field and a small gravity and the shape cannot approximate a sphere. Therefore, it hangs in space like a tumbler and cannot be driven by magnetic force to rotate. If the moon has a strong magnetic field, the magnetic field of the Earth will drive it to have a reverse rotation. In the solar system, for small planets and small satellites, the rotation caused by collisions or other reasons may often happen or stop.

The moon with rotation or without rotation is a simple question of circular motion. It is probably debated for many times in the history. There are two root causes for this debate. The first one may be that the understanding of "false translation" is not clear. The other one is that the standard of objects with no rotation in the universe is unknown.

Translational motion is the movement of object in a straight line. The route of each point in the object is parallel and object will not have a rotation. From the kinetic point of view, translation motion is that there is no force act on the object or the force direction and the move direction are in a straight line.

What is the false translation motion? There is a good practical example, which finally solved the false translation the truth of the false translation.

The motion of observation cab in ferris wheel is a false translation motion. However, in mechanics of rigid bodies, this motion is considered as a true translation motion and translation motion can happen in curve line. According to the logic of mechanics of rigid bodies, the motion of a bowl of water, which moves up and down at the same time along the horizontal direction (fluctuation), is also called translation motion. The route of each point in the object with a false translation motion is not a straight line and intersects with each other. This false translation motion is contradictory with translation motion and it is incorrect. From the kinetic point of view, the force direction and the move direction of the false translation motion are not in a straight line. It is consisted of two simple motions.

The observation cab orbits around the center of ferris wheel, at the same time, it has a synchronous reverse rotation around the above axle. If the observation cab and the above axle are fixed, it can only have a revolution but not rotation. Like the building and basketball which is stationary on the ground, they can only have a revolution around the Earth without rotation. Similarly, the moon orbits around the Earth without rotation. If the Earth did not rotate, one side of the Earth will face the sun all the time and the other side will opposite the sun, i.e., there is no concept of day and night in the Earth.

There is no absolute translation motion in the universe but there exists absolute revolution. Revolution and rotation are dynamic problems; their references cannot be chosen discretionarily. The rotation is only relative to the spin axis and is not absolute. Not all celestial bodies or objects have rotation. However, revolution is both absolute and relative and is relative to orbiting center.

This is the difference between heliocentric theory and geocentric theory.

There is no necessary inherent connection between revolution and rotation. In the universe, even though there are countless celestial bodies, the synchronization of rotation and revolution is almost impossible. It can only be presented by man-made mechanical control.

In the universe, there are two criteria of object which does not rotate. One is described in geometrical features: objects have one side always face the center of revolution and the other side always opposite the center of revolution. The other is described in physical characteristics: the rotation torque and the angular momentum (angular velocity) of object are zero; the angular momentum of revolution (angular velocity) is not zero. The objects without rotation on the ground and in the heaven are all like the foregoing statement. Translation motion is just a special case with an infinite large orbit radius in the criteria, or to say, an ideal state.

In the process of moon revolution, there is only a phenomenon of swinging back and forth (The phenomena of physical libration and comet are most obvious).There is no phenomenon of continuous rotation. The continuous rotation only has a distinction of fast and slow rotation; it is impossible for physical libration to happen. Also not all the celestial bodies rotate.

6 Conclusions

In this paper, the translation and rotation laws of the object (particle) in Newtonian mechanics are generalized. Some deficiencies are pointed out and some supplements and amendment are made. The dissipation work, thermal effect of the force, angular kinetic energy theorem and angular kinetic energy conservation law are complemented. The kinetic energy theorem is amended and the kinetic energy conservation law is clear. The potential energy, conservative forces, functional principle, mechanical energy transformation and conservation laws are "superfluous" in Newtonian mechanics. The unity of conservative forces and non-conservative forces is realized. How to amend Newton's second law, momentum theorem and angular momentum theorem? This question need to be further studied. They can only be approximately used for the motion with a low-speed or short time and they are not applicable for the motion with a high-speed or long time. The formula derivation of dissipation work is not given in this paper. Its practical application should base on experiment.

The motion of celestial bodies in solar system is well explained based on the law of conservation of angular kinetic energy. The motion of celestial bodies complies with conservation

of angular kinetic energy. However, there are some celestial bodies which do not comply with conservation of angular kinetic energy. By analyzing the reason, the criteria of objects without rotation in the universe is clearly proposed. Therefore, the phenomenon of objects without rotation in the heaven and that on the ground is unified. Because I have limited knowledge of astronomy, this is for your reference only.

Although it is hard for people to change their well-known knowledge and notions, we have to make some painful choices for scientific progress and development. (The inaccurate "Moon synchronous rotation" is more stubborn than the "geocentric")

Theory will eventually serve for practice and accept the test of practice. We must know the truth of "boats sail downstream" ($rv^2 = GM$) for aerospace, deep space exploration and the establishment of a permanent space station. The thermal effect of force is a prevalent natural phenomenon in mechanical system; endothermic and exothermic are relative. If gravitational field can develop successfully, using thermal effect of force will make mankind enter a new era with more civilization. (Further discussion later)

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