



New Interactions of Mass and Space Is the Cause of Gravity

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Abstract

The only component of matter according to the current theory is mass. Newton postulated that mass attracts mass and then explained gravity by seeing that matter attracted to matter. On the other hand, a mass can push space quite a bit, according to Einstein. Space may be bent, warped, pushed, or pulled by mass. He described gravity as being caused by the big objects' effects on the curvature of space-time. The concept of relational space has changed. It now has a tangible form. As a result, it is possible for mass and space to interact. The precise nature of interactions between mass and space was not specified by Einstein. Despite having differing foundations, both theories of gravity produce results. However, several phenomena that Newton's idea of gravity remains quiet were explained by Einstein's theory of gravity. The basic cause of gravity cannot be different for Newton and Einstein. Therefore, the source of gravity should be able to produce Newton's equation of gravity and encourage the warping of space around heavy things. It appears that we are unable to understand the origin of gravity. But this is inaccurate. It would be clear that the two theories of gravity complement one another in a way that we are unable to comprehend because of our incomplete knowledge of physical space. The extra-nuclear space structure that surrounds every large entity is created by the new conception of space and the new mass-space interactions [1], which supports Newtonian theory of gravity. This article uses the new fundamental interactions between mass and space to explain gravity. According to the new theory, matter is a mass-space integral system at every moment and space itself is physical. It is a space-mass integral system since physical space also contains space matter particles. The fundamental interactions of the fundamental elements (mass and space) are 1) the attraction between mass and space, 2) the repulsion between space and space, and 3) the repulsion between mass and mass [2]. In this article, the new fundamental interactions of mass and space are used to derive Newton's gravitational equation. There is enough room to comprehend many facets of the mechanics of the solar system.

Key words: *Gravity, Cause of gravity, Mass-space interaction, Cause of space-time curvature, Significance of space-time curvature.*



Discussion

Newton conceptualized matter is something that has mass and occupies space. Space perceived by him was relational. Hence the attraction one matters to another is due to mass-mass attraction. If mass-attracts-mass then all mass of universe would collapse to form a large single mass, but it does not happen. Again due to mass-mass attraction the free atoms and molecules in the atmosphere of the earth would **settle** down to the surface of the earth which also does not happen. This breeds doubt on mass-mass attraction even though Newtonian equation of gravity has been verified experimentally and successful in explaining the dynamics of celestial bodies in solar system. On the other hand, Einstein conceptualized gravity through space-time curvature. According to Einstein mass does not attract mass but mass interacts with space and warp it by pushing or pulling. Einstein was able to explain the excess motion of the mercury at perihelion from his concept of gravity. We notice one gravitational effect but two diverse concepts. One accepts mass-mass interaction (attraction) and the other accepts mass-space interaction (attraction). Einstein conceptualized space as physical entity thereby he perceived the mass-space interaction.

This author made a humble attempt to harmonize the diverse concepts of gravity by altering the concept of matter and space in the light of *Vedic* science. According to Vedic science the universe is constituted of *Panchamohabhuta* (*Prithvi, Jal, Vayu, Agni and Akash*). These constituents may be interpreted as solid, liquid, gas, plasma and space. In modern science, solid, liquid, gas and plasma corresponds to different states of matter. Thus, the basic constituents of the universe reduce to mass and space, both being physical. Again according to *Ayurveda* all substances are mixture of 5 basic elements (*panchamohabhuta*), but substances have one major element. The substances are classified according to the major element present in it. Incorporating the above concept of *Ayurveda* in modern science reveals, matter associates space and space associates space matter particles in finer domain. This is feasible only if an interaction (attraction) exists between mass and space. Due to mass-space attraction, the mass of a nucleus celestial body or the mass of an atomic nucleus attracts space from surrounding and forms an extra-nuclear space structure surrounding the mass (nucleus). The space structure remains associated with the nucleus forming one integral system. Physical space is elastic hence it is compressible. Higher space density (space content per unit volume) could be found in compacted spaces. The inverse square law is also followed by the law of mass-space attraction. With the maximum space density at the surface of the nucleus and the lowest space density at the boundary of the space structure approaching the background space density, the related extra-nuclear space of each nucleus has a space density graded structure. As a result, one atom may store significantly more space than the space content of equal volume of background space medium. Hence an atomic system or a celestial body system is the store house of both



mass and space in a background space medium. The amount of space associated with the nucleus is proportional to the mass of the nucleus. The nucleus and the extra-nuclear space structure move and rotate together as one integral system. The extra-nuclear space structure is not a rigid body therefore the spatial spinning-velocity of space structure does not maintain a constant angular velocity. It is governed by make-and-break of gravitational bonding discussed below.

Spatial spinning velocity of extra-nuclear space structure

Any space pocket in extra-nuclear space structure of a celestial body has specific space-density as well as number-density of space matter particles in proportion to the space density. The space density of extra-nuclear space structure is formed due to attraction of mass of the nucleus to the surrounding space. Again due to space-mass attraction the space matter particles are captured by dense space. The space content of extra-nuclear structure is proportional to the mass content of the nucleus and the density of space matter particles is proportional to the density of space (space content per unit volume). The space and space matter particle form one integral system. This is the reason why atomic and molecular particles (space matter particles) in the atmosphere of a celestial body do not settle down on to the surface of the celestial body due to gravity. The space matter particles sense gravity but they are not free to move within space. The space matter particles in space matrix form a composite space fluid and the composite space fluid (air) moves up or down under differential gravity. The space content of extra-nuclear space structure of a celestial body experiences attraction from the mass of the nucleus celestial body and the mass content of space matter particles in space structure experiences centrifugal force when the extra-nuclear space structure of a celestial body rotates. Thus the composite space fluid senses both gravity and centrifugal force.

The space fluid (space structure containing space matter particle) in contact with the surface of a celestial body makes gravitational bonding and rotates at same angular speed as that of the celestial body. It is for this reason we do not experience any relative wind speed due to rotation and revolution of the earth. For example a celestial body rotating at an angular velocity ω has its lower level space-structure spinning at same angular velocity ω . As the distance of space pocket from the nucleus body increases gravity decreases inversely as the square of distance but centrifugal force increases directly with distance.

The centripetal force (gravity) on an air pocket is given by

$$G M_E M_a / R^2$$

And the centrifugal force on the air pocket (CF) is given by $M_a \omega^2 R$



(Where CF= Centrifugal force; M_E = Mass of the earth; M_a = Mass of air pocket; ω = Angular velocity of air pocket; R = Radial distance of air pocket from center of the earth.)

When R increases, gravity decreases rapidly and CF increases linearly. At some distance ($R=R_c$), CF becomes equal to Gravity. Beyond R_c the CF is greater than gravity. Thus the gravitational bond breaks off and the motive torque to rotate the air pocket vanishes. Thereafter the spinning speed of air pocket slows down due to its bonding link with non-spinning inter planetary space. When the spinning speed slows down, the CF reduces and gravitational coupling is re-established. Thus the spinning speed (the spatial tangential velocity v_t) of space medium assumes values given by the following equation.

$$v_t = \sqrt{GM/R}$$

The gravitational equation following mass-mass attraction does not change even when the cause of gravity is identified as mass-space interaction. This is discussed subsequently.

An artificial satellite with orbital distance less than R_c is required to revolve at higher angular speed than the angular speed of the spinning medium to remain in orbit. Such a satellite, if left to itself would quickly slow down its orbital velocity due to the relative velocity between orbital body and the space medium and gravitate towards the central body. But the orbital body orbiting above R_c has the same orbital velocity as that of its adjacent space medium, hence there is no resistance to orbital motion from the space medium. The spinning space fluid is an operator for changing linear momentum to angular momentum by continuously changing the direction of motion of orbital body. This is the basic mechanism in conservation of angular momentum of orbital celestial bodies. A float on spinning water in a bucket makes circular motion where the direction of motion of the float changes continuously by the effect of spinning water.

Gravitational equation from mass-space attraction

Consider the gravitational interaction between atom 1 and atom 2 (or between celestial body 1 and celestial body 2) from mass-space attraction (Fig.1). Atom 1 has mass m_1 and space holding s_1 and atom 2 has mass m_2 and space holding s_2 . The line of action of attraction forces lies on the line joining the centre of mass and the centre of the compact space of the atoms. To avoid overlapping of the force interactions they are shown in schematically. The attraction between m_1 and s_2 is shown as 1 and the attraction between m_2 and s_1 is shown as 2.

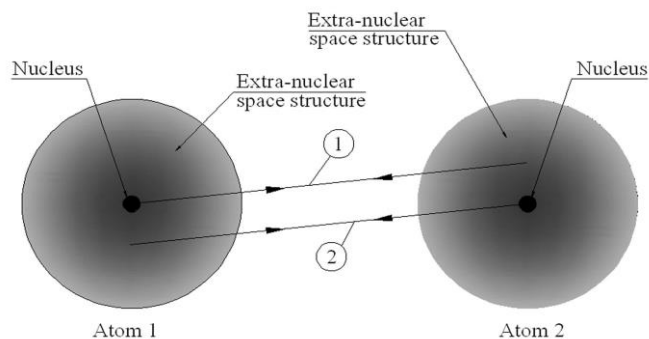


Fig.1 Gravitational interaction between two atoms from mass–space attraction

Gravity due to mass-space attraction

$$F = k (m_1 s_2)/d^2 + k (m_2 s_1)/d^2$$

where, F is the force of gravity between atoms 1 and 2, k is the constant of proportionality of mass-space attraction and d is the distance between the atoms 1 and 2.

The space content of the extra-nuclear space structure of atom is proportional to the mass content of the nucleus in a given background condition (say, earthly condition).

Hence $s_1 = k'm_1$ and $s_2 = k'm_2$, where k' is the constant of proportionality of space holding by mass of nucleus in a given background space density condition.

$$\text{Hence, the equation reduces to } F = 2kk' (m_1 m_2)/d^2 \text{ or } F=G (m_1 m_2)/d^2$$

Gravitational equation considering mass-space attraction, Space-space repulsion and mass-mass repulsion

Gravitational interaction between atom 1 and atom 2 (or between celestial body 1 and celestial body 2) is evaluated here considering mass-space attraction, space-space repulsion and mass-mass repulsion. Atom 1 has mass m_1 and space holding s_1 and atom 2 has mass m_2 and space holding s_2 . All forces act on the line joining the centers of atoms. But in figure they have been shown differently for clear representation without overlapping.

Referring to figure 2 the mass space interactions (1, 2, 3, and 4) are as follows

The force interaction 1: the attraction between mass content of atom 1 and space content of atom 2.

The force interaction 2: the attraction between mass content of atom 2 and space content of atom 1.

The force interaction 3: the repulsion between mass content of atom 1 and mass content of atom 2.

The force interaction 4: the repulsion between space content of atom 1 and space content of atom 2.

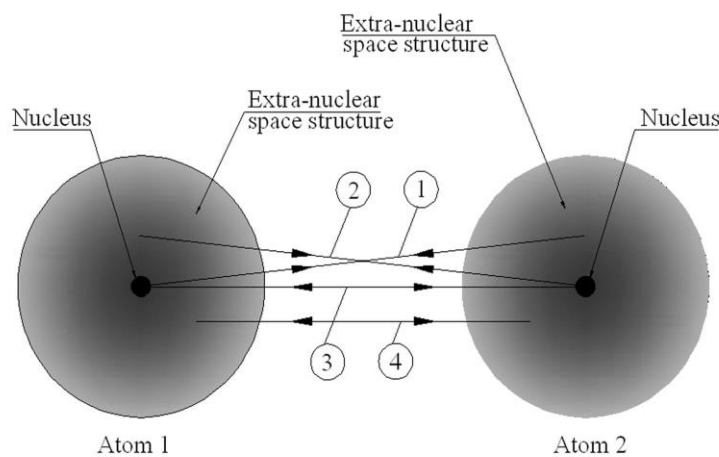


Fig.2 Shows mass-space attraction, mass-mass repulsion and space-space repulsion between atom1 and atom 2 for evaluation of gravity.

Computation of gravity from net interactions of mass and space

The three interactions shown in Fig. 2 are given by-

The force interactions 1 and 2(Mass-space attraction) = $k (m_1s_2)/d^2 + k (m_2s_1)/d^2$

$$= kk' (m_1m_2)/d^2 + kk' (m_1m_2)/d^2$$

$$= 2kk' (m_1m_2)/d^2$$

The force interaction 3 (mass-mass repulsion) = $K_2 (m_1m_2)/d^2$

The force interaction 4(space-space repulsion) = $k_1 (s_1s_2)/d^2$

$$= k_1 (m_1k'm_2k')/d^2 = k_1 (k')^2 (m_1m_2)/d^2$$

Net gravitational attraction



$$= 2kk' (m_1m_2)/d^2 - k_1 (k')^2 (m_1m_2)/d^2 - K_2 (m_1m_2)/d^2$$

$$= \{2kk' - k_1 (k')^2 - k_2\} (m_1m_2)/d^2$$

Where k is the constant of proportionality of mass-space attraction

K' is the constant of proportionality of space holding by mass in a given background space density (earthly reference condition)

k_1 is the constant of proportionality of space-space repulsion

k_2 is the constant of proportionality of mass-mass repulsion

Now substituting $\{2kk' - k_1 (k')^2 - k_2\} = G$

We get, $F = G (m_1m_2)/d^2$

F is always positive therefore the mass-space attraction is stronger compared to mass-mass repulsion and space-space repulsion.

Gravity was considered universal when it explained the orbital motion. But the following questions are pertinent for the dynamics of solar system. How can we say, we completely understand the dynamics ignoring the following questions?

Unstirred questions on dynamics of solar system

- Why the mass of the universe are not pulled together by mass-mass attraction gravity to form a single mass?
- Why the dense free atoms and molecules in the atmosphere of celestial body do not settle down at the surface of the celestial body due to gravity?
- Why the orbits of planets and satellites though elliptical but close to circle?
- Why orbital bodies are not in the equatorial plane of the central gravitating body but are close to the equatorial plane?
- Why the axes of the orbital bodies have a tendency to remain close to perpendicular to the equatorial plane of the central body but not exactly perpendicular?
- Why the Mercury and Venus have no satellites?
- What is the cause of excess motion of mercury at perihelion?
- Why not a single satellite has an orbital body even though an asteroid has?
- Why do Venus, Uranus and Pluto have reverse rotation?
- Why do axes of the reverse rotation planets have inclinations of large obtuse angle?

- Why some satellites have retrograde revolution?
- Why the inclination of orbital planes of the retrograde satellites have large obtuse angles while those of direct motion satellites have small angles?
- Why the locations of retrograde satellites are confined to distant outer orbits?
- It is now seen that the distances of planets from the sun bears a definite correlation and also the distances of satellites of every planet bears similar correlation. Thus discrete nature of orbits exists in solar system as conceptualized in Bohr's atomic model. Hence, the orbits of planets and satellites are no more continuous. Can gravity based dynamics of solar system throw some light on discrete nature of orbit in solar system?



- Can we explain the slow motion of outer stars of galaxy without introducing the hidden mass concept?

Newton's concept of gravity or Einstein's concept of gravity has limitation in explaining the above questions. Thus we need a new understanding of gravity to find answer to above questions.

Conclusion

We may understand universal gravity by many different concepts but the cause of gravity (basic truth) is always one and not this way as well as that way. Every phenomenon has a local cause which is attributed to some local interlinked feature/event but the basic cause corresponds to the nature of universal interactions of the basic constituents (mass and space). This means, though the fundamental forces operating in different domains of nature (different local domains) exhibiting different characteristic interaction properties but all fundamental forces can be derived from the common universal interaction of mass and space. The universal mass-space interaction has scope of explaining electric charge in micro particles in non-equilibrium state of mass-space association where matter with equilibrium mass-space association is a neutral matter [5]. The non-equilibrium mass-space associations in matters of other domains have scope of possessing other non-electric charges. The dynamics of solar system can be better understood by taking into consideration of electric and non-electric charges in addition to gravity. The new concepts of space, extra-nuclear space structure and the rotation & revolution of space structure cannot be ignored in developing the dynamics of celestial bodies.

Reference

1. New basic interaction of mass and space (p-115) vol.3 Dynamics of universe- interplay of matter, space and charge. Author-B.C Mohanty, First edition 2000, ISBN978-81-89726-68-3.
2. Newtonian gravity falls down; Moto Milgrom. New Scientist, 7 march 1985.
3. Effect of deformation of extra nuclear structure (p-94) vol.6, Dynamics of universe- interplay of matter, space and charge. Author-B.C Mohanty, First edition 2018, ISBN978-93-85798-94-8.
4. Vol.2 Dynamics of universe- interplay of matter, space and charge. Author-B.C Mohanty, First edition 2000, ISBN 81- 900989-1-8.
5. New concept of charge appearing from non-equilibrium mass-space structure of matter (p-163) vol.3 Dynamics of universe- interplay of matter, space and charge. Author-B.C Mohanty, First edition 2000, ISBN978-81-89726-68-3.
6. Dynamics of one rotation pre revolution (p-74) vol.2 Dynamics of universe- interplay of matter, space and charge. Author-B.C Mohanty, First edition 2000, ISBN 81- 900989-1-8.