Gravity – An Intrinsic Property of Matter!

A Qualitative Graviton-Orbital-Band Theory

Abdul Malek

TECHNOLOGIE DMI, 980 Rue Robert, Brossard, Québec, J4X 1C9, Canada

abdulmalek@qc.aibn.com

ABSTRACT

All profound theories of nature, life, and society have some philosophical underpinning; the theories of gravity are no exceptions. The theories of gravitation of Isaac Newton and Louis Le Sage were based on mechanical materialism and British empiricism. Albert Einstein developed his theory of gravity based on the abstract four-dimentional spacetime geometrical manifold and the idealist Neo-Berkeleyan "positivism" of Ernst Mach. But none of these theories provide, among other things, any tangible intuition into the development of discrete, quantized and the shell like structure of matter from the subatomic to the cosmic, that modern physics, astrophysics and astronomy are revealing in increasing details. A dialectical and qualitative quantum mechanical approach to gravity based on a concept of quantized graviton-orbitals provides an explanation for the cellular structure in the universe. The general gravitational attractive force is counter-balanced and mediated by the inherent "universal free motions of matter" in its various formations from the microcosm to the macrocosm.

Indexing terms/Keywords

Gravity, Quantized Graviton-Orbitals, Discrete Shell-like Structures, Plasma Crystals,"universal free motion"

Academic Discipline And Sub-Disciplines

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Introduction

A Qualitative Quantized-Graviton-Orbital Theory of Gravity:

A qualitative theory of gravitation based on a model of chemical bonding is presented here in. It is assumed that gravitons (of near zero rest mass, charge 0 and spin 2 as predicted by Quantum Theory of Gravity) form an integral part of the elementary particles in nature. The gravitons as bosons are their own virtual particles and like the photons, are also their own antiparticles. It is assumed that the gravitons exist as a cloud (or a standing wave) around elementary particles in quantized orbitals in loop-like band superstructure (like electrons in an atom) and can extend over long ranges in the empty space around the particle center. This speculative idea was inspired by the recent report [1] about the possibility of the existence of "General relativistic boson stars" and a related highly speculative idea that dark matter could be in the form of a single giant boson star in which galaxies are embedded.

It may be possible to describe these graviton orbitals by some Schrödinger type wave equations, however a formal quantitative mathematical description may be impossible due to the problems of renormalization and the occurrence of infinities. A strictly quantitative quantum mechanical description of atoms and molecule is possible only in the case of very few simple systems. A qualitative narrative of the structure and bonding is enough to understand most of chemistry and biochemistry. In the same way, it is hoped that a qualitative and empirical approach may help to develop an understanding of the celestial bodies in particular and the universe in general. It needs to be emphasized that gravitation is a cumulative attractive force that has no known repulsive counterpart like the electromagnetic force that is operative in chemical bonding. The nature of graviton bonding like the boson stars can probably be studied by using similar set of stellar structure equations to those used for more conventional stars. Particularly, the equations would probably be similar to those describing neutron stars and result in similar properties.

Being bosons, the gravitons can be visualized to exist in large but finite numbers in the same orbital of an elementary particle, as a loop-like laser beam. The graviton band is stabilized through attractive forces with the particle center as well as with other concentric graviton bands around the same particle center, mediated by the exchange of virtual gravitons. When two elementary particles or atoms come close together, part of their gravitons in the superstructure delocalize over the two centers (just the same way as in a molecular orbital) and this leads to a gravitational attractive or exchange force between the particles; the same way as chemical, electromagnetic, electro-weak and strong nuclear forces operate.

This attractive force is directly proportional to the density of the gravitons and hence the masses of the two particles and is inversely proportional to the square of distance between the particle centers as expressed by Newton's law of gravity. In the absence of any other forces, these two particles will have the tendency to fall towards each other. The delocalization continues (like metallic bonding) over large number of particle centers and over patches of matter either solid, liquid or gas and can extend over galaxies and clusters of galaxies. Gravity is a cumulative force and is unscreened by any intervening mass. Gravitational force is always attractive even in the super-cluster range. At very large e.g. extra super-cluster range, this exchange force (like nuclear force) becomes inoperative or may even act as a repulsive force. The recent report [1] about the possibility of the existence of "General relativistic boson stars" is in conformity with the localization of gravitons and the possible existence of graviton bands or orbitals.

To operate over galactic range, the gravitons as quantum particles, must posses much faster than light velocities as implied in the experimental testing of Bell's inequality theorem and as proposed by Tom Van Flandern [2]. Gravitons can move along the orbital bands like electrons that move over long distance through conducting media. Over inter-galactic and cluster ranges gravitational force may manifested itself as an exchange force like the other three forces of nature, where the gravitons acts as their own virtual particles and have very large but finite ranges. At large distance from the center of mass and hence at lower potential energy levels, the graviton orbitals may have directional characteristics like the p, d, f etc. orbitals of electrons.

Patches of matter ranging from the subatomic to the super-clusters of galaxies are therefore, bathed in a non-homogeneous dynamic sea of gravitons, where the gravitons impart a cohesive/attractive force between particle centers that function in addition to the other forces of nature and it is the only dominant force in the long range. The graviton clouds may exist in quantized and concentric contours around such mass centers as fundamental particles, planets, stars, galaxies and clusters of galaxies etc, that extend as a halo over a few orders of magnitude beyond the radii of these centers. Matter points around these massive centers are therefore arranged along the graviton orbitals in shell like structures as we observe in the satellite, planetary, galactic and galactic-cluster structures in the visible universe. This general attractive force is counter-balanced by the inherent "universal free motions of matter" in its various formations from the microcosm to the macrocosm [3]

The strength of the gravitational force is proportional to the density of the graviton cloud and is the strongest at the core of the galaxies and their clusters. This force (probably at non uniform scale) may be operative from the subatomic to the cosmic range and may have qualitatively and quantitatively different characteristics at very high or very low graviton cloud concentrations.

Any mass-object or electromagnetic radiation (photons) moving with a relative velocity through the graviton clouds will feel a deceleration (viscosity drag) through the "Jaakkola" or other similar effects that will be proportional to the cloud density, the mass and the velocity of the moving object or photons. Toivo Jaakkola [4], proposed an electro-gravitational coupling (EGC) interaction to explain the cosmic redshift as opposed to the expanding cosmological effect.

This simple and qualitative idea in conjunction with the recent postulates by this author [5] & [6] about the spontaneous appearance and disappearance of matter/antimatter (probably in the form of hydrogen and some other minor low mass atoms) and the propagation of galaxies through ejection/dissipation of matter from the existing galactic core propelled by the large scale and catastrophic annihilation reaction of chance accumulated patches of matter and antimatter, or other still unknown processes of ejection, provide a rational basis for many of the observational and empirical phenomena in the universe, which is infinite, eternal and ever-changing [7] in space and time in the Galilean sense. Some of the observed phenomena in the short or planetary ranges, mid or stellar ranges, large or galactic ranges and very large or cluster and super-cluster ranges are discussed below:

A. Effects at Short (Terrestrial) Range:

I. A very small but finite additional attractive force due the graviton bonding may be operative in the binding of the baryons and leptons in an atom, in addition to the nuclear and electro-weak forces. This may also partly account for the quantum electro-dynamic forces, which is observed as the "Lamb Shift" and other effects at the atomic scale.

II. The Van der Waals and Casimir forces and the formation of plasma crystals [8] observed in laboratory experiments can be explained at least in part on the basis of graviton- orbital bonding. This type of short-range graviton orbital formation may have major implications in the initial formation of HI and HII clouds from newly created matter/antimatter in the galaxies, leading to the formation of nebula, star clusters and the eventual evolution of the galaxies. At a certain region and in the absence of any intrinsic organizing force, these newly created HI atoms that are randomly scattered over vast distances within the galaxy may band along the operating graviton bands of the galaxy and are grouped into clouds through long range graviton bonding among the atoms. These atomic clouds eventually lead to molecular clouds where additional chemical and other electro-magnetic forces become operative. Further concentration and chemical transformation of these clouds is effected through their interaction with the existing clouds of dust/atom plasma and the catalytic processes of the plasma crystals, which leads to the formation of nebula and eventually to the formation of stars where nuclear fusion processes come into operation. In this scenario all the forces of nature play their part in the evolution of the galaxies where the gravitational force play the decisive role, counter-balanced by the inherent "universal free motions of matter" [3].

III. **The equivalence of kinetic and gravitational mass**

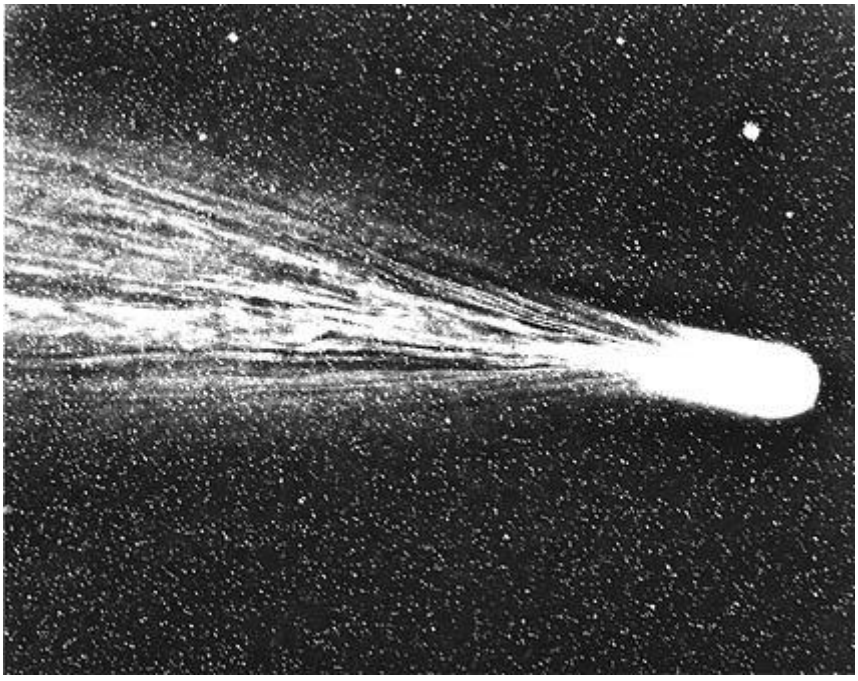
Near the surface of a planet, like earth and in the absence of resistance from the atmosphere, the kinetic motion of a body relative to the planet will feel a viscosity drag proportional to the mass and the velocity of the body and the density of graviton cloud through which it is moving. Since for a finite range near the surface of the earth the graviton-cloud density may be assumed to be constant, the mass of a body will face the same drag whether it feels acceleration due to gravity or is propelled by an applied force. This will explain the equivalence of the kinetic and the gravitational mass; which was explained by invoking warped space-time in GR of Einstein This is also the reason why two bodies of different mass will fall at the same rate as in the famous experiment of Galileo.

B. Medium (Stellar) Range Effects

I. Planetary and Stellar Systems:

In the stellar and planetary nebula range quantized graviton orbital bands may in addition to other factors such as orbital velocities [3] play an important role in the organization of the stars and planets in their orbits as a local phenomenon in the overall graviton cloud structure of the galaxy containing the stars and the planets. For the evolution of a planetary system, the size and mass of the mother nebulae, its chemical composition, dynamics (rotation etc.), graviton cloud structure etc. are major factors in the composition and the distribution of the planets and their satellites in their orbits. The quantized nature of the graviton cloud around a massive body like the sun may be an important factor in the distribution of the planets (and their satellites) around the star. As is discussed below, it is possible that a similar quantized or cellular structure may manifest itself in the organization of matter in all celestial structures like galaxies, and clusters of galaxies etc. A spectacular example of such a cellular structure even in the dust tail of Halley's comet is shown below:

Structures in the dust tail of Comet Halley



Original plate taken with the UK Schmidt Telescope, David Malin, Nature, 320, 577 (1986)

II, The Advance of the Perihelion of the Planet Mercury::

The motion of Mercury in its orbit around the sun will be retarded (gravitational drag) in proportion to its mass, speed and the graviton density along its path. This effect will be the highest at the perihelion where the speed of Mercury and the graviton density is highest because of its proximity to the sun . This will cause a certain perturbation of the motion of Mercury and lead to the precision of the perihelion [3]. This effect will be much smaller for other planets, which are at larger distances from the sun and revolved around it at lower speeds.

III. Time Delay of Signals (Shapiro Effect), Pioneer Anomaly, Gravitational Red Shifts:

All these effect have been observed experimentally. Although the Shapiro Effect and Gravitational Red Shift have been explained on the basis of GR and even modified Newtonian dynamics, the Pioneer Anomaly remains a mystery. Pioneer 10 and 11 were sent on missions to Jupiter and Jupiter/Saturn respectively. The calculated position of the Pioneers did not agree with measurements based on timing the return of the radio signal being sent back from the spacecraft. These consistently showed that both spacecraft were slowing down more than they should be, by thousands of kilometers. If the Pioneer anomaly is a gravitational effect due to some long-range modifications of the known laws of gravity, it does not affect the orbital motions of the major natural bodies in the same way. Hence a gravitational explanation would need to violate the equivalence principle of GR, which states that all objects are affected the same way by gravity. All these effects may be explained on the basis of the slowing down ("viscosity drag") of moving bodies and/or electromagnetic radiation in the dense graviton cloud of the sun and in the surrounding graviton orbitals in the extended halo. A somewhat arbitrary explanation [9] was given based on an alleged anisotropic radiation pressure caused by the spacecraft's heat loss.

IV. The Bending of Star Light:

The celebrated experiment on bending of star light by the gravity of the sun performed by Aurther Eddington in 1919 was purported to provide an incontrovertible proof of GR and warped space-time. But this may be a simple case of refraction of the star light in the graviton cloud of the sun due to a combination of Jaakkola, Wolf, Brillouin, Dynamic Multiple Scattering etc. factors..

V The Dust Rings Around Supernova 1987A

Supernova 1987A in X-ray and visible light.

Credit: X-ray: NASA/CXC/U.Colorado/S.Zhekov et al.; Optical: NASA/STScI/CfA/P.Challis

Supernova 1987A exploded in the Large Magellanic Cloud. Two sheets of dust near the Supernova deflected some light from the Supernova. The sheets of dust were observed as two concentric rings and were seen long after the star faded away, because the scattered light cover a longer path to reach the earth. The dust rings are about 470 and 1,300 light years away from the supernova center. Supernova 1987A belonged to a cluster of stars. It is possible to speculate that these dust rings existed along the quantized graviton orbitals of this star cluster and were made visible through the scattering of the intense supernova radiation by these dust shells. No explanation for this ring structure based on GR or any other hypothesis is available.

C. Large (Galaxies and Groups) Scale Effects:

1. Dark Matter

No direct evidence for the existence of dark matter or its nature is available. Its presence is inferred from the motions of celestial objects. The orbital motion of the peripheral objects in an assembly (stars in a galaxy, galaxies in a cluster etc.) is too high for gravity of the visible mass of the assembly to retain them in place. Some additional matter (dark matter) amounting to more than 90% of the total mass of the assembly is necessary to stop its disintegration. In addition, Gravitational lensing of distant galaxies is purported to show that there are far more matter than one observes as visible mass. The dark matter is also required in the big bang model to enable gravity to amplify the small fluctuations in the primordial atom (in the Big Bang scenario) enough to form the large-scale structures that we see in the universe today. Dark matter is supposed to be the dominant source of gravitational forces in the Universe.

The graviton orbital model eliminates the necessity of the mystical dark matter halo in the galaxies and their clusters. Graviton orbital like molecular orbital in a chemical systems provides the necessary glue and cohesive force to keep the patches of matter in galaxies and clusters in place and allow for the observed high rotation velocities of the objects at the periphery. In addition, the Newtonian gravitational constant (G) at any point in space may be a function of matter and graviton concentration at that point. At very high matter /graviton concentration such as at the core of galaxies or cluster of galaxies G may attain vastly different value through some resonance or synergistic effect. G measured in the terrestrial environment and extrapolated within the solar system is taken to be an universal constant all through the universe in both Newtonian and General Relativity theories. Moreover, if one accepts the view of Ambartsumian and the dialectical view proposed by this author [6] that dispersion/ejection is the fundamental process in the evolution of the universe, (and not conglomeration of diffuse matter through the formation of virialized and dynamically relaxed structures); then the need of dark matter to keep galaxies from disintegration does not arise.

II The Structure of the Galaxies

The distribution of matter within the galaxies may have cellular or quantized structure because of the existence of graviton orbitals. This is obvious enough in spiral galaxies, where the spiral structure is stabilized over billions of years, even under a strong pull of the outer arms towards the center of the galaxy. It is possible that more compact galaxies such as E or SO types may also have similar but less obvious cellular structures. Deep photographic plates of elliptical galaxies do indeed reveal faint shells that extend out to 2/3 times further beyond the more luminous structures. NGC 3923 for example show extensive network of circular arc extending over 150,000 light years from the galactic center as shown below.

The shells of NGC 3923

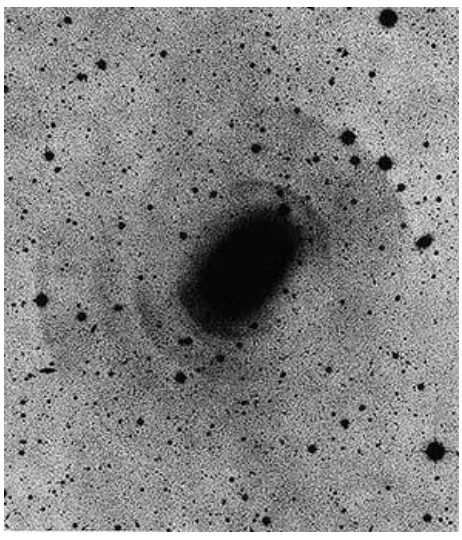


Photo by David Malin & David Carter on Anglo-Australian Telescope

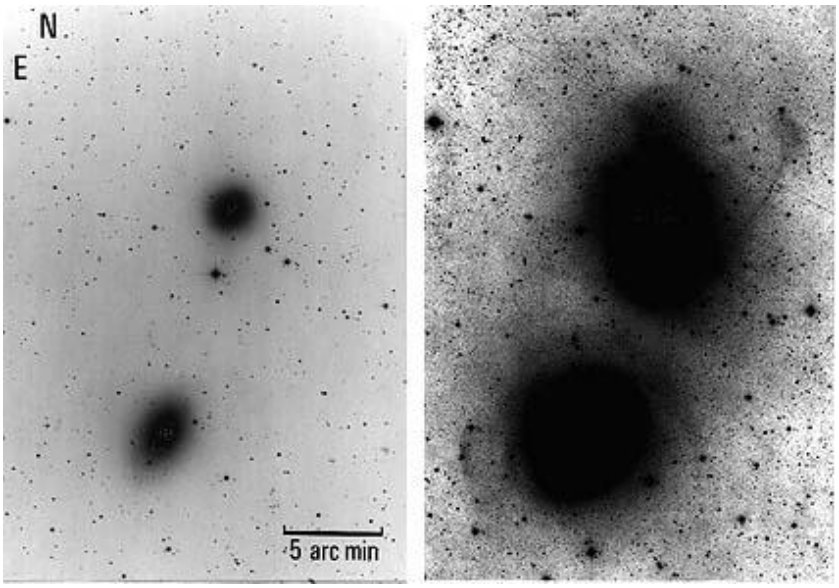
This type of shell like structure seems to be a general phenomenon for elliptical galaxies. In a Catalogue of Elliptical Galaxies with Shells, David Malin and David Carter [10] lists 150 new examples and illustrates some unusual specimens, such as NGC 1344, NGC 3923, and NGC 1549-53, mostly discovered using photographic amplification on UK Schmidt plates.

More specific and detailed information on the galactic rings appeared recently in a catalogue, published in the Monthly Notices of the Royal Astronomical Society, that includes 113 such rings in 107 galaxies [11] known around 2009. Six are dust rings in elliptical galaxies, while the rest (the majority) are star-forming rings in disc galaxies. The nuclear rings are ring-shaped star-forming configurations located around galactic nuclei, as shown in the example below:

The largest atlas of nuclear galactic rings has been unveiled. (Credit: NASA, ESA, D. Maoz, G. F. Benedict et al.)

The possibility that two nearby galaxies can interact through the overlap of their outer graviton orbitals is shown in the following photograph of galaxies NGC 1549 and NGC 1553. This picture shows striking similarities with the distribution of electron clouds in a diatomic molecule!

Faint structures around NGC 1549-53



These galaxies were listed in the Malin-Carter catalogue of ellipticals with shells.

D. Very Large (Extra-galactic) Range Effects:

1. Clusters and Super Clusters Formation

It is conceivable that galaxies in groups, clusters, superclusters etc. interact with each other through graviton-orbital bonding (as it seems evident from the above picture of NGC 1549 and NGC 1553) to form dynamic but shell-like structures with the satellite clusters arranged in a hierarchy along the graviton orbitals of the central dominant clusters. This is dramatically demonstrated in the recent photograph of Abell 2218 (picture bellow), a rich galaxy cluster composed of thousands of individual galaxies. It sits about 2.1 billion light-years from the Earth (redshift 0.17) in the northern constellation of Draco. The ring like structure of this galaxy cluster have been explained in GR model as due to gravitational lensing of background galaxies by the dominant foreground cluster producing multiple images. It is possible that even in large clusters, graviton bonding is strong enough to stabilize these structures with the observed high radial motion of the objects at the periphery. Hence, a mystical "dark matter" to account for this anomalous stability thus becomes unnecessary.

Abell 2218 (Credit: NASA, ESA, and Johan Richard (Caltech, USA))

Below is a composite optical and X-ray image of a Super cluster pair

Composite optical and X-ray image of galaxy clusters Abell 222 and Abell 223. The cluster pair is connected by a filament permeated by hot X-ray emitting gas. (Credit: ESA/ XMM-Newton/ EPIC/ ESO (J. Dietrich)/ SRON (N. Werner)/ MPE (A. Finoguenov))

At the range of super clusters and beyond, galaxies appear to be distributed in filaments, strings and in thin sheets that surround large seemingly empty bubbles or voids up to 300 million light years in diameter. It is possible that at very large distances from the central mass the graviton orbitals possess directional characteristics like the p, d & f etc. atomic orbitals. Alternatively, the gravitational interaction at large (extragalactic range) may take the form of an exchange force involving virtual gravitons and the bonding between clusters acquire directional characteristics due to very large distances involved, giving rise to string or filament like structures. Out side the range of exchange force, gravitational interaction becomes inoperative and may even act as a repulsive force representing the so-called "dark energy"

REFERENCES

[1] F.E.Shunck and E.W.Mielke, "General Relativistic Boson Stars", Class. Quantum Grav., 20 (2003) R301-R356.

[2] T.V. Flandern, "Gravity" in Pushing Gravity, M.R. Edwards Ed. Apeiron, Montreal, (2002) 93.

[3] A. Malek, "THE CONCEPTUAL DEFECT OF THE LAW OF UNIVERSAL GRAVITATION OR 'FREE FALL': A DIALECTICAL REASSESSMENT OF KEPLER'S LAWS, J. Adv. Phys, Special Issue, vol. 13, No. 5 (2017) 4876 - 4880

[4] T. Jaakkola, "Action-at-a-Distance and Local Action in Gravitation", ibid, (2003) 155 .

[5] A. Malek, "The Cosmic Gamma-Ray Halo – New Imperative for a Dialectical Perspective of the Universe", Apeiron, 10, No. 2, April 2003) 165.

[6] A. Malek, "Ambartsumian, Arp and the Breeding Galaxies", Apeiron, 12 (No. 2, April 2005) 256.

[7] A. Malek, "The Infinit.as a Hegelian Philosophical Category…", Progress in Physics,v10, issue 4, (2014), 212 – 216

[8] H.M. Thomas, G.F. Morfill, "Plasma Crystals", Springer Link, 28 Dec. (2006).

[9] S.G. Turyshev, S. G.; Toth, V. T.; Kinsella, G.; Lee, S.-C.; Lok, S. M.; Ellis, J. "Support for the Thermal Origin of the Pioneer Anomaly". Physical Review Letters. 108 (24): (2012) 241101.

[10] D. Malin and D. Carter, "A Catalogue of Elliptical Galaxies with Shells", Ap. J., 274, (1983) 534-540. Nature, 320 (1986) 577.

[11] S. Comerón, J. H. Knapen, J. E. Beckman, E. Laurikainen, H. Salo, I. Martínez-Valpuesta, R. J. Buta. AINUR: Atlas of Images of NUclear Rings**.**Monthly Notices of the Royal Astronomical Society, 2010; 402 (4): 2462 DOI: 10.1111/j.1365-2966.(2009).16057.x