Orbital Velocity-Radius Quantization Mechanism Hidden Behind Newton's Law Of Orbital Velocity Of Celestial Objects

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Introduction

This paper is to present one discovery claim pertaining to a quantum gravity mechanism that appears to hide behind Newton's law of orbital velocity of celestial objects, as:

Orbital radius-velocity quantization mechanism

Naming Conventions:

Specific shorthand words commonly used in this paper are:

Captor:
a celestial object of different type that is orbited by one or many other celestial objects.

Captive:
a celestial object of different type that orbits another celestial object.

G:
Newton's gravitational constant

c:
speed of light in vacuum

Orbital Radius-Velocity Quantization Mechanism's Nature

This discovery claim hereby postulates that:

Newton's law of orbital velocity of captives is an emergent classical law of gravitation, whose formula is:

$$V^2 = GM/R \qquad (u1)$$

where:
V is the actual orbital velocity of a specific captive around its captor.
M is the mass of the captor

And the fundamental law behind it is the orbital radius-velocity quantization mechanism.

Orbital Radius-Velocity Quantization Mechanism's Simple Rule

This orbital radius-velocity quantization mechanism is extremely simple, and can be understood via its application to the Solar system as follows:

Step #1:

Take any planet of the Solar system, then

Collect its observed orbital velocity V and orbital radius R

That will be used as input or output of verification of this cosmic quantum mechanism

Step #2:

Calculate the orbital radius defined by this cosmic quantum

mechanism via a simple multiplication operation with:

A multiplier defined by:

Calculating a divisor of speed of light (D_c for short) for this planet via the formula:

$$D_c = c / V$$

where:
c is the the speed-of-light in vacuum
V is the observed orbital velocity of this planet.

This divisor of speed-of-light is called here the Orbital quantizer.

Then
Squaring the value of this orbital quantizer to obtain the value of the needed multiplier:

$$\text{Multiplier} = D_c^2$$

A multiplicand named Quantum core radius R_c, defined by the formula:

$$R_c = GM/c^2$$

where:
M is the mass of the Sun

Calculate the value of this quantum mechanism-yielded orbital radius R via the multiplication:

$$R' = R_c \times D_c^2$$

Step #3 (final):

Compare this quantum mechanism-yielded orbital radius R' with the planet's observed one R, the two values must match each other.

The mismatch margin can be around 1% (as I found) due to the fact that planets can get tugged on in their orbit by their counterparts.

Orbital Radius-Velocity Quantization Mechanism's Components

This orbital radius-velocity quantization mechanism comprises the two quantum components:

Quantum Core Radius:

As first component of the mechanism:

Quantum Core Radius (Rc for short):

Quantum core radius is a quantum based radius generated by the gravitational mass (GM) of a captor, which is also the latter's effective orbital motion energy potential (Eg), hence:

$$\mathbf{R_c = E_g = GM/c^2} \qquad \text{(w2)}$$

Quantum core radius of a captor affects each of its captives in the determination of the latter's classical orbital radius.

Orbital Quantizer:

As second component of the mechanism:

Orbital Quantizer (Dc for short):

Orbital Quantizer is for each captive alone.

Orbital Quantizer is created by a captor uniquely for a specific captive to determine the latter's final orbital radius

and orbital velocity.

Orbital Quantizer is specified by the two equivalent formulas:

Orbital Quantizer's First Formula:

$$\mathbf{D_c = c / V} \qquad \text{(s1)}$$

where:
c is the speed of light in vacuum
V is the final/actual orbital velocity of a specific captive around its captor.

Orbital Quantizer's Second Formula:

$$\mathbf{D_c = \sqrt{[R / R_c]}} \qquad \text{(s2)}$$

where:

R is the final/actual orbital radius of a specific captive around its captor.

R_c is the quantum core radius, defined by (w2)

D_c is the bridge between the orbital velocity and the orbital radius of the same captive

Orbital Radius-Velocity Quantization Mechanism's Formulas:

Orbital Velocity Quantization Formula:

The following formula - from (w2) - shows how the actual orbital velocity of a captive is quantumly created:

$$\mathbf{(V \times D_c)^2 = GM / R_c} \qquad \text{(x1)}$$

where:
V is the final/actual orbital velocity of the captive

D_c is the orbital quantizer generated by the captor for this captive

M is the mass of the captor

R_c is the quantum core radius, defined by (w2)

Orbital Radius Quantization Formula:

The following formula - from (x1) - shows how the actual orbital radius of a captive is quantumly created:

$$\mathbf{R = R_c \times D_c^2} \qquad \text{(y1)}$$

where:
R is the final/actual orbital radius of the captive with respect to its captor

R_c is the quantum core radius, defined by (w2)

D_c is the orbital quantizer generated by the captor for this captive

And in terms of concrete value:

$$\mathbf{R = [GM/c^2] \times D_c^2} \qquad \text{(y2)}$$

Fundamentals Of Orbital Quantizer

The speed of light is the base for the determination of all orbital quantizers.

Only one orbital quantizer can exist for a captive: Therefore two formulas of both orbital velocity and orbital radius of the same captive must have the same value of orbital quantizer.

Hidden Correlation Of Orbital Quantizer And Lorentz Factor

Based on my findings, there is a hidden correlation between this orbital quantizer and the Lorentz factor:

The Lorentz factor's formula:

$$\gamma = 1/\sqrt{(1 - v^2/ c^2)}$$

Can be rewritten as:

$$\boldsymbol{\gamma = 1/\sqrt{(1 - 1/Dc^2)}} \qquad \text{(s7)}$$

Simply because the speed-of-light ratio component β of the Lorentz factor as:

$$\boldsymbol{\beta = v / c = 1 / Dc} \qquad \text{(s6)}$$

It appears here that:

The Lorentz factor directly reveals the existence of the orbital quantizer.

Characteristics Of Quantum Core Radius In Orbital Radius-Velocity Quantization Mechanism

Quantum Core Radius' Origin

Based on my findings,

The quantum core radius Rc, which must be also the orbital motion energy potential of the captor, defined as:

$$Rc = Eg = GM/c^2 \qquad (=w2)$$

Is part of my other discovery claim of

Quantum Kick-Freeze Orbital Motion Mechanism

which is fully presented in my two books:

Orbital Velocity-Radius Quantization Mechanism Hidden Behind Newton-Einstein Gravity

Kinetic-Electromagnetic-Gravitational Dimension Behind Newton-Einstein Gravity

The quantum core radius (R_c) is the mathematical link between the quantum kick-freeze orbital motion mechanism and the orbital radius-velocity quantization mechanism.

Quantum Formula Of Classical Orbital Velocity:

The classical orbital velocity of a captive is defined by:

$$\mathbf{V = c / D_c} \qquad (=s5)$$

and also by:

$$\mathbf{V^2 = GM / [R_c \times D_c^2]} \qquad (=v1)$$

Function Of Determination Of Orbital Quantizer Via Captor's Gravitational Energy Potential To Obtain Gravitationally Suitable Radius Of A Captive:

Based on my findings,

Each captor must possess a quantum function to

Determine the value of the orbital quantizer by means of its gravitational energy potential in order to obtain a gravitationally suitable orbital radius of a captive.

Quantum function has two components:

The quantum core radius for all captives.

The orbital quantizer for a specific captive.

This quantum function operates a:

Simple multiplication operation with two components:

The quantum core radius is the multiplicand.

The square value of the orbital quantizer is the multiplier.

Evidence Of Orbital Radius-Velocity Quantization Mechanism Through Planets And Asteroids Of The Sun

Evidence Of Orbital Radius-Velocity Quantization Mechanism Through Planets of The Solar System:

This orbital radius-velocity quantization mechanism was verified with:

Mercury, Venus, Earth. Mars, Jupiter, Saturn, Uranus, Neptune

The purpose of this verification is to show a consistent and tight correlation between:

The actual orbital velocity of a planet in the Solar system,

which is solely based on the observed data (orbital period and orbital circumference).

which must yield its own orbital quantizer D_c value via

$$D_c = c / V \qquad (=s1)$$

and

The predicted orbital radius for the said planet via:

$$R = R_c \times D_c^2 \qquad (=y1)$$

which is solely based on the value of the gravitational energy potential of the Sun (R_c) and the square value of the orbital quantizer D_c of the said planet.

That must yield

A Match between the predicted orbital radius and the observed one for the said planet.

Reference Data Of This Verification:

The Sun's effective gravitational energy potential dedicated exclusively to orbital motion of each captive as quantum core radius R_c:

$$R_c = GM_{sun}/c^2 = 1{,}476.6919 \text{ km}$$

based on the values of:

M_{sun} = 1.9885e+30 kg (as mass of the Sun)
G = 6.6743e-11 ($N\ kg^{-2}\ m^2$)
c = 299,792,458 m

Verification Sample Via Mercury:

Mercury's observed orbital velocity value as:

$$V_{mercury} = 47.87 \text{ km/s}$$

Hence Mercury's orbital quantizer D_c value as:

$$D_{cmercury} = 6{,}262.62 \quad (= c / V_{mercury})$$

We deduce Mercury's predicted orbital radius:

$$R_{mercury} = D_{cmercury}^2 \times R_c \Rightarrow$$
$$= 6{,}262.62^2 \times 1{,}476.6919 \text{ km hence}$$

= 57,916,386 km

It turns out that:

> Mercury's predicted orbital radius of 57,916,386 km tightly matches Mercury's observed orbital radius value of 57,910,000 km (Δ=0.011%)

Other Verification Cases:

My thorough calculations show that Mercury is not an exception; this claimed orbital radius-velocity quantization mechanism affects all planets of the Solar system the same way.

Here are my found values of orbital quantizers of these planets:

Dc_mercury	6,262.62
Dc_venus	8,560.60
Dc_earth	10,066.90
Dc_mars	12,451.40
Dc_jupiter	22,937.44
Dc_saturn	30,938.33
Dc_uranus	44,022.38
Dc_neptune	55,210.39

Evidence Of Orbital Radius-Velocity Quantization Mechanism Through Asteroids of The Sun:

My calculations show that this claimed orbital radius-velocity quantization mechanism affects indeed the following asteroids that revolve around the Sun:

Icarus, Aten, Apollo, Ra-shalom, Toro, Phaethon, Adonis

Here are the found values of orbital quantizers of these asteroids:

D_{c_icarus}	10,449.37
D_{c_aten}	9,882.39
D_{c_apollo}	12,210.51
$D_{c\_rashalom}$	9,181.44
D_{c_toro}	11769.95
$D_{c\_phaethon}$	11,349.32
D_{c_adonis}	13,771.53

Evidence Of Orbital Radius-Velocity Quantization Mechanism Through Earth's Moon

My calculations show that this claimed orbital radius-velocity quantization mechanism affects indeed the Moon.

Verification Case of Earth's Moon:

The Earth's effective gravitational energy potential dedicated exclusively to orbital motion of any of its captives as:

$R_c = GM_{earth}/c^2 = 0.0044351999$ m

based on values of:

M_{earth} = 5.9724e+24 kg (as mass of the Earth)
G = 6.6743e-11 (N kg^{-2} m^2)
c = 299,792,458 m

Earth's Moon's orbital quantizer value from:

V_{moon} = 1,022 m, becomes

D_{cemoon} = 293,339

It is worth noting that the orbital quantizer D_{cemoon} value of Earth's Moon is exactly an integer. This peculiarity reinforces the quantum nature of this mechanism.

And that leads to:

$R_{emoon} = 293{,}339^2$ x 0.0044351999 m, hence:

R_{emoon} = 381,639 km

It turns out that:

The Moon's predicted orbital radius of 381,639 km tightly matches the Moon's observed orbital radius value of 384,000 km (Δ=0.615%)

Evidence Of Orbital Radius-Velocity Quantization Mechanism Through S* Stars of Sagittarius A* Supermassive Black Hole's System

My full calculations show that the orbital radius-velocity quantization mechanism affects the black hole system of Sagittarius A* which comprises a large number of S* stars revolving around it at a very high velocity.

Only the representative study case of the star S4715 is presented in this paper. This is because:

S4715 star has an eccentricity value of 0.247 therefore its elliptical orbit can be correctly readjusted to a circle, hence much less askew to determine its mean orbital radius.

The Sagittarius A* black hole's effective gravitational energy potential dedicated exclusively to orbital motion of each captive

as:

$GM_{sagit}/c^2 = 6{,}349{,}775$ km

based on values of:

$M_{sagit} = 8.55055e+36$ kg (mass of Sagittarius A*)
(estimated about 4.3 million suns)
(or 1.9885e+30 kg x 4.3e+6)
$G = 6.6743e-11$ ($N\ kg^{-2}\ m^2$)
$c = 299{,}792{,}458$ m

With S4715's orbital period value as:

$T_{s4715} = 637{,}030{,}000$ seconds or 20.2 years

and S4715's semi-major axis value as:

$Ra_{4715} = 177{,}572{,}672{,}520$ km

and S4715's semi-minor axis value as:

$Rb_{4715} = 172{,}070{,}583{,}261$ km (from $b = a \times \sqrt{1 - e^2}$)

We obtain S4715's mean orbital circumference value as:

$U_{s4715} = 1{,}098{,}504{,}686{,}526$ km (from Ra_{4715} and Rb_{4715})

We obtain S4715's observed mean orbital velocity value as:

$V_{s4715} = 1{,}724.42$ km/s (from U_{s4715} and T_{s4715})

We obtain S4715's mean radius value (from U_{s4715}) as:

$R_{s4715} = 174{,}832{,}486{,}103$ km

Then S4715's orbital quantizer Dcs_{4715} value becomes:

$Dcs_{4715} = 173.85$

And that leads to S4715's variable radius:

$R_{s4715} = 173.85^2$ x 6,349,775 km, hence:

R_{s4715} = 191,914,472,514 km

And S4715's eccentricity-readjusted variable radius R_{s4715a} (by $1–0.247^2$) becomes:

R_{s4715a} = 180,205,962,460 km

which matches S4715's observed semi-major axis value as: 177,572,672,520 km (Δ=01.48%)

which matches S4715's observed mean radius value as: 174,832,486,103 km (Δ=03.04%)

Final Conclusion

This paper has been to present, explain and postulate my discovery of:

A fundamental quantum cosmic mechanism called:

”Orbital Radius-Velocity Quantization Mechanism”.

This cosmic mechanism with its functions reveals the quantum nature that hides behind Newton's law of orbital velocity of celestial objects.

This is because, the actions resulting from these cosmic mechanisms and functions can only exist by means of discrete values:

The orbital velocity of a celestial object can only have an integer value via a divisor of speed of light (discovered as the shared orbital quantizer with the orbital radius thereof).

The orbital radius of a celestial object - obtained from a multiplication operation - can only have integer values for

its components:

Orbital radius' multiplicand as an integer value of (n x GM/c^2).

Orbital radius' multiplier as an integer value because of the square value of the shared orbital quantizer (with the orbital velocity) which is itself an integer value.

By the same token, one can see that

This cosmic mechanism appears to host many elements of a so-called quantum gravity.

My Research Books

I have been developing my theory of gravity for quite some time. Many of my discovery claims that are intertwined or relevant to the claim in this paper can be found in my following books.

Orbital Velocity-Radius Quantization Mechanism Hidden Behind Newton-Einstein Gravity

Kinetic-Electromagnetic-Gravitational Dimension Behind Newton-Einstein Gravity

Quantum Gravitational Kick $6\pi GM/c^2$

Singularity-Free Black Hole's Equation $6\pi GM/c^2$

Quantum Entanglement Continuum