Einstein's Spacetime Curvature Claim Belied By One Second Loophole Of His Own Perihelion Precession Equation

Author: Antoine (Khai) Nguyen
email: antoinekhainguyen@gmail.com

Abstract

I have potentially discovered a loophole inside Einstein's two equations for perihelion precession, known as:
ε = 24π3 a2 / T2 c2 (1-e2)
ε = 6πGM / c2 (1-e2) a
and two ultra-simple alternative equations thereto, defined as:
ε = 6π x (v/c)2 / (1-e2) (d0.0)
ε = (6π / Dc2) / (1-e2)

All these discoveries appear to demonstrate that Einstein's spacetime curvature claim from Mercury's perihelion precession is contradictory in its own mathematical principle:

Einstein's spacetime curvature claim was braced with the entire orbit of Mercury, as curvature (of spacetime) must logically imply the full orbital period, but his equations were braced with one second-based sampling without repetition thereof.

My potential discoveries presented hereafter are to explain how Einstein's spacetime curvature claim is belied by his own equations for Mercury's perihelion precession angle:

Potential Discovery #1:

There exists Two new potential discovered ultra-simple equivalent alternative equations to

Einstein's two equivalent equations for perihelion precession of a captive (i.e. planet) around its captor (i.e. star), known as:

$$\varepsilon = 24\pi^3 a^2 / T^2 c^2 (1-e^2) \quad \text{(e1.0)}$$

$$\varepsilon = 6\pi GM / c^2 (1-e^2) a \quad \text{(e0.0)}$$

where
ε is the angle of perihelion precession of the involved captive
a is the semi-major axis of the orbit of this captive
T is the orbital period of this captive
c is the speed of light in vacuum
e is the eccentricity of the orbit of this captive
M is the mass of the captor (celestial object)
G is Newton's gravitational constant

And the two said new potential discovered equivalent alternative equations are called hereafter as:

:

Orbital quantizer-frequency-deriving equations:

$$\boldsymbol{\varepsilon = 6\pi \text{ x } (v/c)^2 / (1-e^2)} \qquad \text{(d0.0)}$$

$$\boldsymbol{\varepsilon = (6\pi / Dc^2) / (1-e^2)} \qquad \text{(d1.0)}$$

where
ε is the angle of perihelion precession of the involved captive
v is the orbital velocity of this captive
c is the speed of light in vacuum
e is the eccentricity of this captive

Dc is the orbital quantizer-frequency of this captive, defined as:

$$\mathbf{Dc = c / v} \qquad \text{(s1.0)}$$

where
c is the speed of light in vacuum
v is the orbital velocity of the involved captive

And Dc is alternatively called the orbital frequency (f) of this captive, defined as:

$$\mathbf{f = c / v} \qquad \text{(s2.0)}$$

Potential Discovery #2:

Additionally, the two said new potential discovered equivalent alternative equations are able to

Demonstrate that

Einstein's spacetime curvature claim from Mercury's perihelion precession is contradictory in its own mathematical principle

Because Einstein's spacetime curvature claim was braced with the entire orbit of Mercury, as curvature (of spacetime) must logically imply the full orbital period, but his equations were braced with one second-based sampling without repetition thereof.

Potential Discovery #3:

My two potential discovered equivalent alternative equations

Reveal some new potential characteristics of gravity:

Orbital quantizer (Dc) and Orbital frequency (f)

Gravitational energy quanta for perihelion precession

These potential discoveries will be fully explained in the subsequent segments of this paper.

Special Naming Conventions:

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 (called captor).

Mathematical Explanation From Einstein's Core Equation For Mercury's Perihelion Precession

Einstein's Core Equation For Mercury's Perihelion Precession

As a matter of fact,

Einstein's core equation in 1915:

$$\varepsilon = 24\pi^3 \frac{a^2}{T^2 c^2 (1 - e^2)}$$

is identical to Paul Gerber's equation in 1898 (17 years older)

To this day, the only accepted cause of perihelion precession anomaly on captives is

Einstein's spacetime curvature from his general relativity theory

According to Einstein's general relativity theory,

Mercury's perihelion precession is just a

Spacetime curvature's manifested artifact upon Mercury's orbit around the Sun

And this artifact can be predicted by the said Einstein's core equation for perihelion precession (=e1.0).

Einstein's Own Verification Of His Core Equation For Mercury's Perihelion Precession

Let's redo

Einstein's own mathematical verification of his core equation for Mercury's perihelion precession angle:

$$\varepsilon = 24\pi^3 a^2 / T^2 c^2 (1-e^2) \qquad \text{(=e1.0)}$$

where:

ε is the resulting perihelion precession angle (in radians) of the involved planet

a is the semi-major axis (in meters) of the involved planet

T is the orbital period (in seconds) of the involved planet

c is the speed of light in vacuum

e is the eccentricity of the orbit of the involved planet

with the astronomical data:

Mercury's Orbital Period (T):	87.994617 days
Mercury's Semi-major Axis (a):	57,910,000 km
Mercury's Orbital Eccentricity:	0.206
Speed of light (c):	299,792,458 m/sec

Then the solution value of Mercury's perihelion precession angle "ε(mercury_core_eq)" becomes as follows:

ε(mercury_core_eq) per radian per orbital revolution

= 0.0000005016710939677646679 radian per orbital revolution (v1.0)

which comes from:

$= 24\pi^3 (57{,}910{,}000{,}000)^2 /$
$(87.994617 \text{ day}^2 \text{ x } 86{,}400 \text{ sec}^2 \text{ x } 299{,}792{,}458 \text{ m/sec}^2 \text{ x } (1-0.206^2))$

In order to trace ε(mercury_core_eq) back to its historic value of 43 arc-seconds per century, we need to convert first the previously obtained

ε(mercury_core_eq) in radian (=v1.0) to per orbital revolution to

ε(mercury_core_eq) in degrees per orbital revolution

= 0.000028743636388 degrees per orbital revolution

from: 0.00000050167109396776466679 radian x 180 / π

Then to

ε(mercury_core_eq) in arc-seconds per orbital revolution

= 0.1034770909968 arc-seconds per orbital revolution

from: 0.000028743636388 degrees x 3600 arcs

Then to

ε(mercury_core_eq) in arc-seconds per year

= 0.4295058 arc-seconds per year

from: 0.1034770909968 arc-seconds x
(365.2421988 day per year / 87.994617 day per orbit)

And finally to

ε(mercury_core_eq) in arc-seconds per century

= 42.95058 arc-seconds per century

from: 0.4295058 arc-seconds x 100

which closely fits the historic observed value ε(mercury_observed_value) of 43 arc-seconds per century.

New Analysis Approach Of Einstein's Core Equation For Mercury's Perihelion Precession

In order to yield new revelations, let's rewrite Einstein's core equation that calculates the radian based value of Mercury's perihelion precession angle:

$$\varepsilon = 24\pi^3 a^2 / T^2 c^2 (1-e^2) \qquad (=e1.0)$$

By homogenizing the square operator (x^2) that appears to be pervasive here, we get a new rewritten equation as follows:

$$\varepsilon = 6\pi \times 4\pi^2 a^2 / T^2 c^2 (1-e^2) \qquad \text{(e1.1)}$$

Inside this equation, the element

”/$(1-e^2)$”

is just the eccentricity-based adjustment for orbital radius or circumference from the semi-major axis (a) of the captive due the latter's elliptical orbit.

Revelation Of Ratio Between Orbital Velocity Made By A Captive And The Speed Of Light Inside Einstein's Core Equation

Based on my potential findings,

Einstein's core equation for Mercury's perihelion precession hides a fundamental and clear-cut element:

Ratio between the orbital velocity of a captive (moving its own speed per one second) and that the speed of light

And this ratios can be deduced from

The “$4\pi^2 a^2 / T^2 c^2$” element (=e2.0)

And, it becomes relevant here to emphasize that

This ratio is based exclusively on the temporal sampling of one second only

Which is in total contradiction with the fact that Einstein's interpretation of the equation makes reference to the entire orbital period of the captive as evidence of spacetime curvature.

Here is how the findings work.

Derivation Process Of “$4\pi^2 a^2 / T^2 c^2$” Element Inside Einstein's Core Equation:

First, let's decompose the:

“$4\pi^2 a^2 / T^2 c^2$” element (e2.0)

inside Einstein's rewritten core equation for Mercury's perihelion precession:

$$\varepsilon = 6\pi \times 4\pi^2 a^2 / T^2 c^2 (1-e^2) \qquad \text{(=e1.1)}$$

as same as

$$(2\pi \text{ a} / \text{T c})^2 \qquad \text{(e2.1)}$$

or in an interchangeable way as

$$((2\pi \text{ a} / \text{T}) / \text{c})^2 \qquad \text{(e2.4)}$$

Then

"2π a / T) / c" Is in fact the

Ratio (in squared value) between

The orbital velocity made by the captive
(= 2π a / T).

From division of orbital circumference (2π a) by the orbital period (T)

and

The speed of light
(= c)

So finally

$$\varepsilon = 6\pi \text{ x } 4\pi^2 \text{ a}^2 / \text{T}^2 \text{ c}^2 (1\text{-e}^2) \qquad \text{(=e1.1)}$$

becomes:

$$\boldsymbol{\varepsilon = 6\pi \text{ x } (v/c)^2 / (1\text{-}e^2)} \qquad \textbf{(=d0.0)}$$

This new equation (d0.0) - called "orbital quantizer-frequency-deriving equation" - discovered from Einstein's core equation for Mercury's perihelion precession angle reveals that

Einstein uses the solution of his core equation - the angle of perihelion precession (ε) - as evidence of his concept of spacetime curvature but the calculation of the said angle is obtained

On the basis of ONLY ONE SECOND SAMPLING OUT OF the ENTIRE ORBITAL PERIOD of the involved planet.

In other words,

There is no logical way that any claim made out of Einstein's core equation can imply the entire orbital period of Mercury if the underlined cosmic artifact - obtained from the one-second sampling-yielded solution - does not repeat itself throughout the said orbital period.

And yet Einstein found a logical way to extend from the one-second

scope - imposed by his equation - to the scope of the entire orbit in order to back up his claim of spacetime curvature concept.

From “v/c” Ratio To Frequency-Like Ratio “c/v”

Based on my findings,

“v/c” is same as “1/(c/v)

Then we can see here a link to a frequency-like ratio “c/v”.

Meaning Of Discovered “c/v” Ratio And Derived Equations:

The discovered “c/v” ratio

where
c is the speed-of-light
v is the orbital velocity of the involved captive.

reveals itself as a hallmark of a frequency

This is because if one considers

The orbital velocity of a captive as a photon wavelength (λ).

then

The orbital frequency (f) of a captive is no other than

the division of the speed-of-light (c) by the orbital velocity (v) of the involved captive

In other words,

The discovered “c/v” ratio behaves like an orbital frequency (f) of any captive,

Based on my other discoveries so far,

The discovered “c/v” ratio carries:

Three quantum functions of the captive with respect to its orbit:

Orbital quantizer (for its orbital velocity)

Orbital frequency

Hence, their new name “orbital quantizer-frequency”.

For the purpose of equation notation simplification and consistency with my previous discovered equations (presented in other papers),

The original denotation "Dc" will be used here to denote the discovered "orbital quantizer-frequency".

("Dc" was originally a short name for "Divisor of speed of light") .

And the definition of the equation of orbital quantizer-frequency (Dc) is as followed:

$$\mathbf{Dc = c / v} \qquad \text{(s1.0)}$$

Which is alternatively the equation of the orbital frequency:

$$\mathbf{f = c / v} \qquad \text{(s2.0)}$$

where
v is the orbital velocity of the involved captive
f is the frequency of the involved captive
c is the speed of light in vacuum

And the direct derivation from (s1.0) yields two new equations as:

$$\mathbf{c = v \text{ x } Dc} \qquad \text{(s4.0)}$$

$$\mathbf{v = c / Dc} \qquad \text{(s5.0)}$$

And finally, the new Lorentz factor-included equation:

$$\boldsymbol{\varepsilon = 6\pi \text{ x } (v/c)^2 / (1\text{-}e^2)} \qquad \textbf{(=d0.0)}$$

becomes the new orbital quantizer-frequency-deriving equation:

$$\boldsymbol{\varepsilon = (6\pi / Dc^2) / (1\text{-}e^2)} \qquad \textbf{(=d1.0)}$$

or

$$\boldsymbol{\varepsilon = (6\pi / f^2) / (1\text{-}e^2)} \qquad \textbf{(=d1.1)}$$

Declaration Of New Discovered Orbital Quantizer-Frequency-Deriving Equation For Captives' Perihelion Precession

My previous analysis and discovery therefrom leads to the declaration of a set of new equivalent equations named:

Orbital quantizer-frequency-deriving equations of captives' perihelion precession angle:

$$\boldsymbol{\varepsilon = 6\pi \text{ x } (v/c)^2 / (1\text{-}e^2)} \qquad \text{(=d0.0)}$$

$$\boldsymbol{\varepsilon = 6\pi \text{ x } (v^2/c^2) / (1\text{-}e^2)} \qquad \text{(=d0.1)}$$

$$\boldsymbol{\varepsilon = (6\pi / Dc^2) / (1-e^2)} \quad \text{(=d1.0)}$$

$$\boldsymbol{\varepsilon = (6\pi / f^2) / (1-e^2)} \quad \text{(d1.1)}$$

where:
ε is the resulting perihelion precession angle (in radians) of the involved captive
v is the orbital velocity of the captive
c is the speed of light in vacuum
e is the eccentricity of the orbit of the captive

Dc is the orbital quantizer-frequency of the involved captive, defined as follows:

$$\boldsymbol{Dc = c / v} \quad \text{(=s1.0)}$$

f is the orbital frequency of the involved captive:

$$\boldsymbol{f = c / v} \quad \text{(=s2.0)}$$

Based on my previous findings,

The gravitational kick energy, known via its equation:

$$\boldsymbol{6\pi GM/c^2 = 2\pi \times 3GM/c^2} \quad \text{()}$$

where
3 is the quanta value of the quantum gravitational kick energy generated by the captor
2π is the expansion factor of the quantum gravitational kick energy of the captor translated onto the orbit of the captive

Is hidden inside

Einstein's gravitational mass-based equation for perihelion precession:

$$\varepsilon = 6\pi \times GM / a\, c^2\, (1-e^2) \quad \text{(=u1.0)}$$

By the same token,

There must be the same deep orbital quantization connection inside all the aforementioned orbital quantizer-frequency-deriving equations, hence:

$$\varepsilon = (6\pi / Dc^2) / (1-e^2) \quad \text{(=d1.0)}$$

Can be rewritten as:

$$\boldsymbol{\varepsilon = (3 \times 2\pi / Dc^2) / (1-e^2)} \quad \text{(d1.5)}$$

where

3 is the quanta value of the radius-distributed gravitational energy of the captor

2π is the expansion factor of the radius-distributed gravitational energy of the captor onto the orbit of the captive

Discovery Of Orbital Frequency Of Captives:

One interpretation of

The discovered orbital quantizer-frequency-deriving equation for perihelion precession:

$$\varepsilon = (6\pi / f^2) / (1-e^2) \quad (=d1.1)$$

And its reduced format

$\varepsilon = (6\pi / f^2)$ for circular orbit instead of elliptical one

reveals that

The gravitational energy that pushes the captor-captive axis (i.e., Sun-Mercury) to rotate around the captor by a small angle

Finds its origin in a Hertz count (or count of cycles per second) out of the square value of the orbital frequency of the captive, and

The relevant Hertz count here is a quanta of value 3

This Hertz count-based gravitational energy manifests itself on the orbital circumference of the captive via the multiplication of the said Hertz count (quanta value) by 2π

Verification Of Orbital Quantizer-Frequency-Deriving Equation For Perihelion Precession With Planets In Solar System

In this segment, the verification of the orbital quantizer-frequency-deriving equation for perihelion precession will be proceeded upon some relevant planets and asteroids of the Solar system in order to see whether or not the solution values from this new equation match those from Einstein's counterparts.

Verification Of Orbital Quantizer-Frequency-Deriving Equation For Perihelion Precession With Planets In Solar System

Verification With Mercury's Perihelion Precession:

Let's calculate the value of the angle – denoted as $\varepsilon(\text{mercury\_oqf})$ - of Mercury's perihelion precession using the new orbital quantizer-frequency-deriving equation (d1.0) then compare this solution value with both the relevant value obtained from Einstein's core equation – simply denoted as "relativistic value" - and the observed value from public data.

Based on the observed velocity data as:

Captives:	Mean Orbital Velocity
Mercury (v_mercury)	47.87 km/s

First, we must calculate:

Mercury's orbital quantizer-frequency ($D_{c\_mercury}$) as follows:

$D_{c\_mercury} = c / v\_mercury = 6{,}262.63$

from: 299,792,458 (ms^{-1}) / 47,870 (ms^{-1})

Then

$\varepsilon(\text{mercury\_oqf})$ using the orbital revolution-based sampling and the radian unit is defined via the new orbital quantizer-frequency-deriving equation:

$$\varepsilon(\text{mercury\_oqf}) = 6\pi \times (1/Dc\_mercury)^2 / (1 - e\_mercury^2) \qquad (=d1.0)$$

hence

$\varepsilon(\text{mercury\_oqf})$ = 0.000000501903 radian per revolution →

from: $6\pi \times (1/6{,}262.63)^2 / (1 - 0.206^2)$=

which is about 1.00046 times the observed value of:

ε(Einstein's equation) = 0.0000005016710939677646679 radian

$\varepsilon(\text{mercury\_oqf})$ = 0.000028756923 degrees per revolution →

from: 0.000000501903 radian x 180 / π

$\varepsilon(\text{mercury\_oqf})$ = 0.1035249228 arc-seconds per revolution →

from: 0.000028756923 degrees x 3600 arcs

ε(mercury_oqf) = 0.429704358 arc-second per year →

from: 0.1035249228 arc-seconds x
(365.2421988 day per year / 87.994617 day per revolution)

ε(mercury_oqf) = 42.9704358 arc-seconds per century

which closely fits the historic value of 43 arc-seconds per century of ε(mercury).

Verification With Venus' Perihelion Precession:

Let's calculate the value of the angle – denoted as ε(venus_oqf) - of Venus' perihelion precession using the new orbital quantizer-frequency-deriving equation (d1.0)

Based on the observed velocity data as:

Captives:	Mean Orbital Velocity
Venus (v_venus)	35.02 km/s

First, we get:

Venus' orbital quantizer-frequency (Dc_venus)

$= c / v\_venus = 299{,}792{,}458\ (ms^{-1}) / 35{,}020\ (ms^{-1})$
$= 8{,}560.60$

Then

ε(venus_oqf) using the orbital revolution-based sampling and the radian unit is defined via the new orbital quantizer-frequency-deriving equation:

$$\varepsilon(venus\_oqf) = 6\pi \times (1/Dc\_venus)^2 / (1-e\_venus^2) \qquad (=d1.0)$$

hence

ε(venus_oqf) = 0.00000025720109 radian per revolution →

from: $6\pi \times (1/8{,}560.60)^2 / (1 – 0.00677^2)$

ε(venus_oqf) = 0.0000147365369 degrees per revolution →

from: 0.00000025720109 radian x 180 / π

ε(venus_oqf) = 0.05305153284 arc-seconds per revolution →

from: 0.0000147365369 degrees x 3600 arcs

which matches the observed value of 0.0530 arcsecs per revolution of ε(venus).

ε(venus_oqf) = 0.086233460 arc-second per year →

from: 0.05305153284 arc-seconds x
(365.2421988 day per year / 224.7 day per revolution)

ε(venus_oqf) = 8.6233460 arc-seconds per century

which closely matches the relativistic value of 8.6186 arc-seconds per century of ε(venus).

which matches even better the observed value of 8.6247 ± 0.005 arc-seconds per century of ε(venus).
(Source: Pitjeva 2007, C. M. Will 1993, Biswas-Mani 2008)

Verification With Earth's Perihelion Precession:

Let's calculate the value of the angle – denoted as ε(earth_oqf) - of Earth's perihelion precession using the new orbital quantizer-frequency-deriving equation (d1.0)

based on the observed velocity data as:

Captives:	Mean Orbital Velocity
Earth (v_earth)	29.78 km/s

First, we get:

Earth's orbital quantizer-frequency (Dc_earth)

= c / v_earth = 299,792,458 (ms^{-1}) / 29,780 (ms^{-1})
= 10,066.90

Then

ε(earth_oqf) using the orbital revolution-based sampling and the radian unit is defined via the new orbital quantizer-frequency-deriving equation:

ε(earth_oqf) = 6π x (1/Dc_earth)^2 / (1-e_earth^2) (=d1.0)

hence

ε(earth_oqf) = 0.0000001859467 radian per revolution →

from: 6π x $(1/10{,}066.90)^2$ / $(1 – 0.0167^2)$
= 18.84955592 / (101,342,475.61 / 0.99972111)

ε(earth_oqf) = 0.00001065396 degrees per revolution →

from: 0.0000001859467 radian x 180 / π
= 0.00001065396

ε(earth_oqf) = 0.038354256 arc-seconds per revolution →

from: 0.00001065396 degrees x 3600 arcs

which matches the observed value of 0.0383 arcsecs per revolution of ε(earth).

ε(earth_oqf) = 0.038354256 arc-second per year →

from: 0.038354256 arc-seconds x
(365.2421988 day per year / 365.2421988 day per revolution)

ε(earth_oqf) = 3.8354256 arc-seconds per century

which closely matches the relativistic value of 3.8345 arc-seconds per century of ε(earth).

which highly matches the observed value of 3.8387 ± 0.004 arc-seconds per century of ε(earth).
(Source: Pitjeva 2005, C. M. Will 1993, Biswas-Mani 2008)

Verification With Mars' Perihelion Precession:

Let's calculate the value of the angle – denoted as ε(mars_oqf) - of Mars' perihelion precession using the new orbital quantizer-frequency-deriving equation (d1.0)

based on the observed velocity data as:

Captives:	Mean Orbital Velocity
Mars (v_mars)	24.077 km/s

First, we get:

Mars' orbital quantizer-frequency (D_{c_mars})

= c / v_mars = 299,792,458 (ms^{-1}) / 24,077 (ms^{-1})
= 12,451.40

Then

ε(mars_oqf) using the orbital revolution-based sampling and the radian unit is defined via the new orbital quantizer-frequency-deriving equation:

ε(mars_oqf) = 6π x (1/Dc_mars)^2 / (1-e_mars^2) (=d1.0)

hence

ε(mars_oqf) = 0.00000012265068 radian per revolution →

from: 6π x (1/12,451.40)^2 / (1 – 0.0934^2)
= **(**18.84955592 / 155037361.96) / 0.99127644

ε(mars_oqf) = 0.000007027366 degrees per revolution →

from: 0.00000012265068 radian x 180 / π

ε(mars_oqf) = 0.0252985176 arc-seconds per revolution →

from: 0.000007027366 degrees x 3600 arcs

which matches the observed value of 0.0530 arcsecs per revolution of ε(mars).

ε(mars_oqf) = 0.013451277 arc-second per year →

from: 0.0252985176 arc-seconds x
(365.2421988 day per year / 686.93 day per revolution)

ε(mars_oqf) = 1.3451277 arc-seconds per century →

which closely matches the relativistic value of 1.3502 arc-seconds per century of ε(mars).

and the observed value of 1.3624 ± 0.0005 arc-seconds per century of ε(mars).
(Source: Nyambuya 2010)

Verification With Jupiter's Perihelion Precession:

Let's calculate the value of the angle – denoted as ε(jupiter_oqf) - of Jupiter's perihelion precession using the new orbital quantizer-frequency-deriving equation (d1.0)

based on the observed velocity data as:

Captives:	Mean Orbital Velocity	Max Orbital Velocity	Min Orbital Velocity
Jupiter (v_jupiter)	13.07 km/s	km/s	km/s

First, we get:

Jupiter's orbital quantizer-frequency (Dc_jupiter)

= c / v_jupiter = 299,792,458 (ms^{-1}) / 13,070 (ms^{-1})

$= 22{,}937.449$

Then

ε(jupiter_oqf) using the orbital revolution-based sampling and the radian unit is defined via the new orbital quantizer-frequency-deriving equation:

$$\varepsilon(\text{jupiter\_oqf}) = 6\pi \times (1/\text{Dc\_jupiter})^2 / (1-\text{e\_jupiter}^2) \qquad (=\text{d1.0})$$

hence

ε(jupiter_oqf) = 0.000000035912209 radian per revolution →

from: $6\pi \times (1/22{,}937.449)^2 / (1 - 0.0487^2)$
$= (18.84955592 / 526{,}126{,}566.627601) / 0.99762831$

ε(jupiter_oqf) = 0.000002057618 degrees per revolution →

from: 0.000000035912209 radian x 180 / π

ε(jupiter_oqf) = 0.0074074248 arc-seconds per revolution →

from: 0.000002057618 degrees x 3600 arcs

ε(jupiter_oqf) = 0.000624454 arc-second per year →

from: 0.0074074248 arc-seconds x
(365.2421988 day per year / 4,332.589 day per revolution)

ε(jupiter_oqf) = 0.0624454 arc-seconds per century →

which closely matches the relativistic value of 0.0623 arc-seconds per century of ε(jupiter).

and matches even better the observed value of 0.0700 ± 0.0040 arc-seconds per century of ε(jupiter).
(Source: Nyambuya 2010)

Verification With Saturn's Perihelion Precession:

Let's calculate the value of the angle – denoted as ε(saturn_oqf) - of Saturn's perihelion precession using the new orbital quantizer-frequency-deriving equation (d1.0)

based on the observed velocity data as:

Captives:	Mean Orbital Velocity
Saturn (v_saturn)	9.69 km/s

First, we get:

Saturn's orbital quantizer-frequency (Dc_saturn)

$= c / v\_saturn = 299{,}792{,}458\ (ms^{-1}) / 9{,}690\ (ms^{-1})$
$= 30{,}938.334$

Then

ε(saturn_oqf) using the orbital revolution-based sampling and the radian unit is defined via the new orbital quantizer-frequency-deriving equation:

$$\varepsilon(saturn\_oqf) = 6\pi \times (1/Dc\_saturn)^2 / (1 - e\_saturn^2) \quad (=d1.0)$$

hence

ε(saturn_oqf) = 0.00000001974618 radian per revolution →

from: $6\pi \times (1/30{,}938.334)^2 / (1 - 0.0520^2)$
$= (18.84955592 / 957{,}180{,}510.695556) / 0.997296$

ε(saturn_oqf) = 0.0000011313727 degrees per revolution →

from: 0.00000001974618 radian x 180 / π

ε(saturn_oqf) = 0.00407294172 arc-seconds per revolution →

from: 0.0000011313727 degrees x 3600 arcs

ε(saturn_oqf) = 0.000138263 arc-second per year →

from: 0.00407294172 arc-seconds x
(365.2421988 day per year / 10,759.22 day per revolution)

ε(saturn_oqf) = 0.0138263 arc-seconds per century →

which closely matches the relativistic value of 0.0137 arc-seconds per century of ε(saturn).

which matches even better the observed value of 0.0140 ± 0.0020 arc-seconds per century of ε(saturn).
(Source: Nyambuya 2010)

Verification With Uranus' Perihelion Precession:

Due to lack of observed data for perihelion precession with respect to Uranus, the verification thereof is not possible here.

Verification With Neptune's Perihelion Precession:

Due to lack of observed data for perihelion precession with respect to Neptune, the verification thereof is not possible here.

Verification With Pluto's Perihelion Precession:

Let's calculate the value of the angle – denoted as ε(pluto_oqf) - of Pluto's perihelion precession using the new orbital quantizer-frequency-deriving equation (d1.0)

based on the observed velocity data from NASA and other sources as:

Captives:	Mean Orbital Velocity
Pluto (v_pluto)	4.74 km/s

First, we get:

Pluto's orbital quantizer-frequency (Dc_pluto)

$= c / v\_pluto = 299{,}792{,}458\ (ms^{-1}) / 4{,}740\ (ms^{-1})$
$= 63{,}247.35$

Then

ε(pluto_oqf) using the orbital revolution-based sampling and the radian unit is defined via the new orbital quantizer-frequency-deriving equation equation:

$$\varepsilon(pluto\_oqf) = 6\pi \text{ x } (1/Dc\_pluto)^2 / (1-e\_pluto^2) \qquad (=d1.0)$$

hence

ε(pluto_oqf) = 0.0000000050114627 radian per revolution →

from: $6\pi \text{ x } (1/63{,}247.35)^2 / (1 - 0.2444^2)$
$= (18.84955592 / 4{,}000{,}227{,}282.0225) / 0.94026864$

ε(pluto_oqf) = 0.00000028713566 degrees per revolution →

from: 0.0000000050114627 radian x 180 / π

ε(pluto_oqf) = 0.001033688376 arc-seconds per revolution →

from: 0.00000028713566 degrees x 3600 arcs

ε(pluto_oqf) = 0.0000041690218 arc-second per year →

from: 0.001033688376 arc-seconds x
(365.2421988 day per year / 90,560 days per revolution)

ε(pluto_oqf) = 0.00041690218 arc-seconds per century →

which closely matches the relativistic value of 0.0004 arc-seconds per century of ε(pluto).

and the observed value of 0.0 ± 0.004 arc-seconds per century of ε(pluto).

Einstein's Other Mass-Based Equation For Mercury's Perihelion Precession Confirms Same One-Second Sampling Inconsistency Of Spacetime Curvature Claim

There exists

Einstein's other equation to calculate the angle of perihelion precession of a captive using the mass element, known as:

$$\Delta\varphi = \frac{6\pi GM}{c^2(1-\varepsilon^2)R}$$

which is same as:

$$\boldsymbol{\Delta\varphi = \varepsilon = 6\pi \text{ x } GM / a\ c^2\ (1\text{-}e^2) \rightarrow} \qquad \text{(u1.0)}$$

or

$$\boldsymbol{\Delta\varphi = \varepsilon = 6\pi \text{ x } [GM / c^2] / a\ (1\text{-}e^2) \rightarrow} \qquad \text{(u1.1)}$$

where:
ε is the resulting perihelion precession angle (in radians) of the involved captive
G is Newton's gravitational constant
M is the mass of the captor
a/R is the semi-major axis/radius (in meters) of the involved planet
e is the eccentricity of the orbit of the involved planet

The derivation from Einstein's core equation to this equation has been obtained by replacing:

The element “($4\pi^2$ x a^3 / T^2)” inside Einstein's core equation:

$$\varepsilon = 24\pi^3\ a^2 / T^2\ c^2\ (1\text{-}e^2) \rightarrow \qquad \text{(=e1.0)}$$

with the element “GM”, based on Kepler-Newton-based equation:

$$G\ M = (4\pi^2 \text{ x } a^3 / T^2) \qquad \text{(=k1.0)}$$

Einstein's Mass-Based Equation Contains Same Inconsistency Of One Second Sampling

Based on my findings, it appears that

Einstein's mass-based equation for perihelion precession:

$\varepsilon = 6\pi \text{ x } GM / a\ c^2\ (1-e^2)$ (=u1.0)

which is same as:

$\varepsilon = [6\pi GM/c^2] / [a\ (1-e^2)]$ (=e0.0)

contains in it two elements:

Captor-generated perihelion precession energy potential (E_p) defined as:

$E_p = 6\pi GM/c^2$ (=u2.0)

and

Eccentricity-adjusted orbital radius (R) defined via semi-major axis (a) and orbital eccentricity (e) as:

$R = a\ (1-e^2)$

and the core element (E_p) reveals that

The value of the resulting angle of perihelion shift (ε) depends exclusively on

The One-second based sampling of the gravitational energy (E_p) of the captor.

Therefore confirms the same inconsistency previously revealed via Einstein's core equation (=e1.1).

Existential Questions For Einstein's Claim Of Spacetime Curvature As Root Cause Of Mercury's Perihelion Precession

Based on this finding,

Many questions arise with respect to the spacetime curvature claim.

Question #1:

What is the probability, if not an extraordinary coincidence, that

gravity happens to use a total man-made unit of time measurement – known as "one second" to generate the one-second-based calculation for the angle of perihelion precession as an artifact of spacetime curvature?

Question #2:

How does spacetime curvature from a captor do in order to always yield the same one-second-based perihelion precession artifact while generating extremely diverse orbital period lengths for equally diverse captor-captive systems (which can be billions seconds or more, in case of far-away captives)?

Final Assessment Of Spacetime Curvature Claim Via Einstein's Equations As Root Cause Of Mercury's Perihelion Precession

Based on the following findings:

There is a major inconsistency:

On one hand,

Einstein's two equations ((e1.0),(e0.0)) - that serve as mathematical evidence of spacetime curvature artifact - yield in fact only one-second-based calculation sampling of the perihelion precession (ε).

And there are no further equations nor argumentations from Einstein as to why or how spacetime curvature just needs only one-second-based sampling for the calculation of the perihelion precession.

And on the other hand,

The observed angle of perihelion shift should not be a time-based sampling value – whether one second or any amount thereof – but should be instead a full orbit-based value, because the perihelion precession occurs only once per orbital revolution.

Final Conclusion

Beyond the fact that

Gerber and Einstein's shared equation of calculation of perihelion precession angle is able to yield solution values that match observed

values

My analyses and potential discoveries appear to reveal that

First,

Einstein's interpretation of his equations as

Evidence of spacetime curvature

Turns out to be inconclusive or premature at best or wrong at worst

This is because

The backing equations themselves predict the angle of the orbital axis advancement of any captive by means of the one-second-based temporal sampling, not the automatic repetition thereof, therefore contradict the interpretation scope of spacetime curvature that implies the entire orbital period.

Second,

There exists a simpler mathematical alternative to Gerber and Einstein's shared equation of calculation of perihelion precession, presented here as:

The new discovered orbital quantizer-frequency-deriving equation for perihelion precession, defined as:

$$\varepsilon = (6\pi / Dc^2) / (1-e^2) \qquad \textbf{(=d1.0)}$$

where

Dc is the orbital quantizer-frequency of the captive, defined as:

$$Dc = c / v \qquad \textbf{(=s1.0)}$$

e is the eccentricity of the orbit of the captive
c is the speed of light in vacuum
v is the orbital velocity of the captive

which is same as

$$\varepsilon = (6\pi / f^2) / (1-e^2) \qquad \textbf{(=d1.1)}$$

where

f is the (orbital) frequency of the captive and is same as Dc

and

This new potential discovered orbital quantizer-frequency-deriving equation reveals

A new quantum feature of orbital velocity of captives called

Orbital quantizer (denoted as Dc)

And the Orbital quantizer behaves like

A Frequency of light

And the kinetic energy to trigger perihelion precession that is just

A “2π” multiplier of an orbital quantizer of quanta value as 3 Hertz

The discoveries that I made and presented in this paper are just a continuity of a set of my previous discoveries. All my discoveries appear somehow to be intertwined with each other. Here are the relevant papers and books:

The gravitational energy kick via perilion precession via Vixra paper:

Potential Quantum Gravitational Kick (6πGM/c2) As Origin Of Mercury's Perihelion Precession Shift Anomaly Instead Of Spacetime Curvature

and via book outlet as:

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

The core description and evidence of this orbital radius-velocity quantizer presented via Vixra paper:

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

and via book outlet as:

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

Reference Data

Relativistic Vs. Observed Perihelion Precession Values Of Solar System's Planets

My calculations are based on the observed values of relativistic orbital precession shifts of the planets in the Solar system as follows:

Captives (planets)	**Relativistic Precession Shift (Per Revolution) in arcsecs**	**Relativistic Precession Shift (Per Century) in arcsecs**	**Observed Precession Shift (Per Century) in arcsecs**
Mercury	0.10338	42.9195	42.98 ± 0.04

			(C. M. Will 1993) (Biswas-Mani 2008)
Venus	0.0530	8.6186	8.6247 ± 0.005 (Pitjeva 2007) (C. M. Will 1993) (Biswas-Mani 2008)
Earth	0.0383	3.8345	3.8387 ± 0.004 (Pitjeva 2005) (C. M. Will 1993) (Biswas-Mani 2008)
Mars	0.0254	1.3502	1.3624±0.0005 (Nyambuya 2010)
Jupiter	0.0074	0.0623	0.0700±0.0040 (Nyambuya 2010)
Saturn	0.0040	0.0137	0.0140±0.0020 (Nyambuya 2010)
Uranus	0.0020	0.0024	None
Neptune	0.0013	0.0008	None
Pluto	0.0010	0.0004	None

References:

C. M. Will 1993: C. M. Will's book “Was Einstein Right? Putting General Relativity to the Test” (1993)

Biswas-Mani 2008: A. Biswas and K. R. S. Mani, Cent. Eur. J.Phys. 6, 754 (2008)

Nyambuya 2010 Nyambuya, G. G. Azimuthally symmetric theory of gravitation – On the perihelion precession of planetary orbits, (2010)