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Theory of Spheres ('Quantum Gravity')

or

Empty Spheres in 'Dimensionless Space' – The 'Fundamental Force' Behind Everything
(Quantum–Gravitational Force, 'Dark Matter' / 'Dark Energy', etc.)

Paper VII: Introduction to the New Quantum Geometry Formalism

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ABSTRACT

In this work, we further develop the trigonometric framework – formulated in 0-dimensions and based on a full rotational phase of 4π (720°) – that provides the quantum language of the fundamental **(0-D) harmonic oscillator** underlying the *Theory of Spheres (ToS)* framework.

Building upon this foundation, we compute the mass values of the three charged leptons directly from the intrinsic geometry of the **Theory of Spheres**, without introducing any free parameters or external fine-tuning (using only a single calibration factor (α_k) applied across all levels), while providing a rigorous description of fundamental quantum structures.

Part A: Introduction

This paper begins by constructing the **0-dimensional** geometric mathematics required for the **Theory of Spheres**, employing the existing angular four relations and the extended trigonometric identity $\sin(\alpha) = \cos(\alpha - \pi/2) = -\cos(\alpha + \pi/2)$ or $\sin(\alpha) = \pm \cos(\alpha \pm \pi/2)$, which forms the basis of the additional quantum-geometric language.

In this framework the function $T^{Q_{D0}}$ replaces the **sin** function and defines the fundamental 0-dimensional trigonometric relation used throughout the extended quantum-geometric language, where the input argument $C_{(t)}$ – replacing the angle α – encodes the dynamic Variable Speed of Light (**VSL**) integrated over time.

Subsequently, by leveraging known cosmological data alongside the quantum–classical duality of the zero-dimensional oscillator, we derive the masses of the charged leptons (electron (**e**), muon (**μ**), and tau (**τ**)) directly from the intrinsic frequency of the variable speed of light within the oscillator of the **Theory of Spheres**, concluding with broader quantum mechanical implications.

Chapter 1: The Eight Phase States of the 4π Cycle

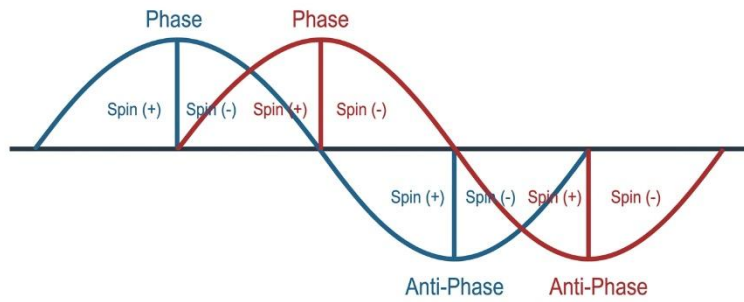


Fig. 1: Spin-Phase Mapping

In Fig. 1, the full 4π rotational phase cycle of the fundamental 0-dimensional oscillator is divided into eight discrete sub-phases across four quadrants. The first four sub-phases ($0 \rightarrow 2\pi$) correspond to the phase evolution observed by an external observer (observing the universe or the oscillator from a distance of a quantum perspective) as **antimatter (M^+)** states, while the subsequent four sub-phases ($2\pi \rightarrow 4\pi$) map, by the same observer, to **matter (M^-)** states (see also Chapter 39 in Paper I).

A summary of these states is given in Table 1

State	1	2	3	4	5	6	7	8
Angle	$0 \rightarrow \pi/2$	$\pi/2 \rightarrow \pi$	$\pi \rightarrow 3\pi/2$	$3\pi/2 \rightarrow 2\pi$	$2\pi \rightarrow 5\pi/2$	$5\pi/2 \rightarrow 3\pi$	$3\pi \rightarrow 7\pi/2$	$7\pi/2 \rightarrow 4\pi$
Phase	+	-	+	-	+	-	+	-
Quadrant	First ($0 \rightarrow \pi$)		Second ($\pi \rightarrow 2\pi$)		Third ($2\pi \rightarrow 3\pi$)		Fourth ($3\pi \rightarrow 4\pi$)	
Spin (sp ($\uparrow/\downarrow$))	SP ($\uparrow/\downarrow$)		SP ($\downarrow/\uparrow$)		SP ($\uparrow/\downarrow$)		SP ($\downarrow/\uparrow$)	
Half-cycle	First ($0 \rightarrow 2\pi$) - expansion quadrants				Second ($2\pi \rightarrow 4\pi$) - contraction quadrants			
Antimatter (M^+)/Matter (M^-)	M^+				M^-			
Particle Type	Positron (e^+), Anti-Muon (μ^+), and Anti-Tau (τ^+)				Electron (e^-), Muon (μ^-), and Tau (τ^-)			

Table 1: Complete phase Map of the 4π Cycle - Spin, Charge and Matter/Antimatter States

Physical Interpretation of Spin and Charge

Following the geometric definitions established in Paper I (Chapters 40–41), spin and charge are not intrinsic scalar parameters, but direct consequences of the oscillator's internal trajectory:

- **Spin Orientation (SP ($\uparrow/\downarrow$)):** Represents the direction of matter/antimatter flow across adjacent quadrants. This matter $\rightarrow$ antimatter or antimatter $\rightarrow$ matter flow is commutative and occurs strictly between quadrants (see paper I, chapter 40, Figure 17). Consequently, while matter, antimatter, and charge are intrinsic to each quadrant; any independent measurement of the initial spin state will yield an arbitrary position ($\uparrow/\downarrow$). However, once established, the directional spin strictly flips at each π boundary (quadrant transition).
- **Conventional Electric Charge:** Arises from the directional oscillation state:
 - Positive Charge (e^+), (μ^+) and (τ^+):** Associated with the two expansion quadrants ($0 \rightarrow 2\pi$, Antimatter domain).
 - Negative Charge (e^-), (μ^-) and (τ^-):** Associated with the two contraction quadrants ($2\pi \rightarrow 4\pi$ Matter domain).

- **Internal Phase Charge:** Defined as the intrinsic difference between orthogonal phase components within the 4π cycle (formally derived via Identity IV, next chapter). This phase charge dictates the inter-quadrant coupling strength, which, as will be shown in subsequent work, determines the internal interactions between quadrants and serves as the true foundation for quark formation and fundamental quantum forces.

As illustrated in Fig. 2, a complete rotation starting from origin point '**O**' returns to '**O**' at 2π radians with inverted phase. Completing the full 4π cycle (**720°**) restores the oscillator to its initial physical state, simultaneously aligning both phase and spin orientation.

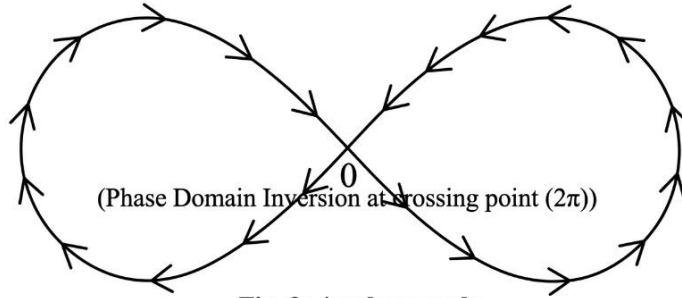


Fig. 2: 4π phase cycle

Chapter 2: The Four Fundamental Trigonometric Identities Using the T_{D0}^Q Function

Instead of the classical sine function $\sin(x)$, which exhibits a periodicity of 2π , we define the fundamental **0-dimensional** phase function T_{D0}^Q , characterized by a full cyclical periodicity of 4π .

Under this formulation, the function $T_{D0}^Q(C(t))$ replaces the conventional sine component, while its quarter-phase shifted representation, $T_{D0}^Q(C(t) - \pi/2)$ corresponds to the classical cosine component.

Identity I - Internal Energy Conservation of the Oscillator

$$\sin^2(x) + \cos^2(x) = 1 \Rightarrow [T_{D0}^Q(C(t))]^2 + [T_{D0}^Q(C(t) - \pi/2)]^2 = 1$$

This identity expresses the internal conservation of energy within the 0D oscillator. The two orthogonal components of the classical trigonometric system are replaced by two phase-shifted states of the T_{D0}^Q function, preserving the unity condition of the cycle.

Identity II - Upward Transition: Matter $\Rightarrow$ Energy

$$\sin(x) \times \cos(x) = 1/2 \times \sin(2x) \Rightarrow T_{D0}^Q(C(t)) \times T_{D0}^Q(C(t) - \pi/2) = 1/2 \times [T_{D0}^Q(2 \times C(t))]$$

This identity describes an upward transition within the oscillator's transfer chamber, representing the conversion of matter-like states into energy-like states. The interaction between two phase-shifted components generates a doubled-cycle state.

Identity III - Downward Transition: Energy $\Rightarrow$ Matter

$$\sin(2x) = 2 \times \sin(x) \times \cos(x) \Rightarrow T_{D0}^Q(2 \times C(t)) = 2 \times T_{D0}^Q(C(t)) \times T_{D0}^Q(C(t) - \pi/2)$$

This identity represents the downward transition from an energy-like state back into a matter-like state. The doubled-cycle state decomposes into two fundamental phase components of the oscillator.

Identity IV - Phase Charge

$$\cos(2x) = \cos^2(x) - \sin^2(x) \Rightarrow T_{D0}^Q(2 \times (C(t) - \pi/2)) = [T_{D0}^Q(C(t) - \pi/2)]^2 - [T_{D0}^Q(C(t))]^2$$

This identity expresses the phase-charge structure of the oscillator. The difference between the squared phase components defines the doubled-cycle state, capturing the internal symmetry between phase and anti-phase.

Chapter 3: Translation into Observational Data and Dual-Angle Scattering Mechanics

To translate the intrinsic theoretical phase evolution into measurable parameters observed in scattering experiments, we define the reduced phase variable:

$$C(t)_{\text{View}} = C(t) \pmod{4\pi} \Rightarrow C(t)_{\text{View}} = C(t) - n \times (4\pi)$$

Where: $n = [C(t) / (4\pi)] \in \{1, 2, 3, \dots\}$ yielding a constrained phase value in the fundamental domain: $0 < C(t)_{\text{View}} < 4\pi$

The resulting value $C(t)_{\text{View}}$ is placed into **Figure 1 or Table 1**, directly yielding the quantum spin orientation and the exact matter/antimatter state of the particle before and after a collision process.

The Phase as a Geometric Vector and the Emergence of Two Scattering Angles

Unlike standard quantum mechanics where the phase is treated merely as a scalar value, the **Theory of Spheres (ToS)** introduces a fundamental geometric paradigm shift: **the phase acts as a unit vector on a 1-radius sphere** within the oscillator's internal phase space.

Because a vector naturally decomposes into orthogonal components, the single scalar phase parameter Φ intrinsically encodes a directional orientation in space, giving rise to **two distinct scattering angles** - the primary scattering angle θ and the azimuthal angle (φ) - prior to any momentum transfer or physical detection.

Phase Decomposition into Orthogonal Vector Components

To compute the three-dimensional spatial scattering angles θ and φ - the actual physical angles at which the scattered particle is detected - a reduction similar of the **mod (4 π)** procedure is performed relative to the **2 π spatial symmetry boundary**. Evaluating the reduced phase relative to the spatial symmetry boundary: $\Phi = C(t) \pmod{2\pi} = C(t) - n \times (2\pi)$

The phase position Φ corresponds to a unit direction vector $\Phi (\Phi_x, \Phi_y)$ defined by: $\Phi_x = \cos (\Phi)$ & $\Phi_y = \sin (\Phi)$

These orthogonal projections generate the two three-dimensional physical scattering angles:

- **Primary Scattering Angle (θ):** The scattering angle within the collision plane:
 $\theta = \arctan (\Phi_y, \Phi_x)$
- **Azimuthal Angle (φ):** The rotational scattering angle around the interaction axis:
 $\varphi = \arctan (\Phi_x, \Phi_y)$

Numerical Demonstration (e.g., Phase $\Phi = 9.2\pi$)

For an internal phase of $\Phi = 9.2\pi$:

- Modulo **2 π** reduction: **$9.2\pi \pmod{2\pi} = 1.2\pi$** .
- Vector components: **$\Phi_x = \cos (1.2\pi) \approx -0.809$, $\Phi_y = \sin (1.2\pi) \approx -0.588$**
- Resulting 3D trajectory angles: **$\theta \approx 216^\circ$, $\varphi \approx 234^\circ$**

This confirms that a single internal phase state geometrically determines the exact 3D spatial trajectory vector (directed in the negative octant, in the example) prior to measurement.

Internal Refraction: Snell's Law Analogy

Because the phase behaves as a geometric vector propagating through the oscillator's internal medium, it experiences structural refraction governed by the internal variable speed of light. The boundary transition follows an internal equivalent of Snell's Law: $n_1 \sin(\theta_1) = n_2 \sin(\theta_2)$ and $n_1 \sin(\phi_1) = n_2 \sin(\phi_2)$

Where n_1, n_2 represent the effective refractive indices of the oscillator phase domains. The entire vector refracts as a unified structure; thus, both angles (θ and ϕ) bend simultaneously, representing a complete directional shift of the internal phase gradient.

Wave-Packet Dispersion Mechanics

Following internal refraction, a subtle angular dispersion is observed around the mean trajectory. This angular spread is not stochastic 'quantum noise', but a deterministic wave-packet dispersion effect.

As collision energy increases (e.g., in heavy leptons such as the τ -particle), the higher frequency components within the internal wave packet experience localized dispersion - strictly analogous to optical dispersion through a refractive medium, where distinct spectral frequencies bend at slightly different angles dictated by the intrinsic phase profile.

Chapter 4: Determining the Maximum Number of Possible Energy Levels

In Papers V and VI, the 0-dimensional oscillator was shown to behave like a '**particle in a box**', with well-defined cosmic boundary conditions. These boundaries allow us to compute the maximum number of discrete energy levels the oscillator can support.

Furthermore, in the **ToS framework**, the **0-dimensional oscillator** operates over a full geometric phase of 4π . Therefore, any value of the varying speed of light **C(t)** must be evaluated **modulo 4π** , reflecting the oscillator's intrinsic periodicity.

The cosmic maximum speed of light is: $C_{\max} \approx 5.8 \times 10^7 \times C_{\text{now}}$ (Paper V, chapter 2, eq-13), where $C_{\text{now}} = 1$ in the normalized natural unit system.

In the **ToS framework**, the varying speed of light follows an exponential distribution: $C(t) \approx e^n$ (Equation I - Papers 1, 2, 3a).

And since $C(t)_{\text{view}} = C(t) \bmod (4\pi) \Rightarrow C_{\max} / 4\pi = e^{n_{\max}}$

Taking the natural logarithm yields the maximum energy levels: $n_{\max} = \ln (C_{\max}/(4\pi))$.

Substituting the cosmic maximum value: $n_{\max} \approx 15$

Conclusion: The 0-D oscillator supports a **maximum of 15 possible energy levels**. This number is fixed by the cosmic boundary $C_{\max}$ and the intrinsic 4π cycle of the oscillator, and is therefore independent of the present value of the speed of light or its future evolution.

Note on notation: This paper uses two distinct natural-unit normalizations.

- Cosmic natural units - where the present-day light speed is set to $C_{\text{now}} = 1$. In these units the cosmic maximum light speed is: $C_{\max, \text{cosmic}} \approx 5.8 \times 10^7 \times C_{\text{now}}$. This scale is used in **Chapter 4** to determine the maximum number of possible energy levels ($n_{\max} \approx 15$).
- Oscillator natural units - the intrinsic geometric units of the **0-D oscillator**, where **1 year $\equiv$ 1 light-year** and time equals spatial phase length. In these units the geometric maximum cycle scale is: $C_{\max, \text{oscillator}} \equiv T_{\max} \approx 3.617 \times 10^{11}$ - this scale is used in **Chapters 5-7** as the normalization constant in the intrinsic frequency and mass formulas.

These two quantities arise from the same cosmological model but represent different natural-unit systems: one for present-day cosmic physics, and one for the internal geometry of the **0-D oscillator**.

Chapter 5: Maximum Number of Allowed Intrinsic Frequency States

Having derived the cosmic maximum energy level bound $n_{\max} = 15$ across the full 4π phase cycle of the **0-D oscillator**, we determine the number of physically allowed discrete states.

Geometric Phase Constraint (Primary Derivation)

The fundamental 4π cycle of the oscillator is divided into four symmetric quadrants of width π . Distributing the **15** maximum energy levels uniformly across the 4π cycle yields an average capacity of: $n_{\max} / 4_{\text{quadrants}} = 15 / 4 = 3.75_{\text{levels per quadrant}}$

In the **Theory of Spheres (ToS)** geometric formalism, a discrete quantum energy state cannot be fractionally split across a quadrant phase boundary (π). Consequently, any non-integer state spanning adjacent quadrants is geometrically forbidden. Taking the floor integer value guarantees complete boundary stability: $n_{\text{quadrant}} = [3.75] = 3$ allowed levels per quadrant.

Multiplied across the four quadrants of the 4π cycle, this defines the exact total capacity of the oscillator: **Total Allowed State** = $3_{\text{allowed levels}} \times 4_{\text{quadrant}} = 12$ discrete energy levels. These **12** allowed intrinsic frequency states correspond directly to the **12** fundamental leptons (matter/antimatter and spin pairs).

Cosmological Scale Consistency

This geometric result aligns precisely with the cosmological boundary derived in Paper V (Part I). Dividing the maximum quadrant cycle duration $T_{\max} \approx 3.617 \times 10^{11}$ years by the characteristic spatial interval of about **100** billion light years yields: $[3.617 \times 10^{11} / 10^{11}] = [3.617] \approx 3$ stable physical levels per quadrant. Here the **100** billion light-years interval derives directly from $T_{\text{full-cycle}} / 15 = (4_{\text{quadrant}} \times T_{\max}) / 15 \approx 1.44 \times 10^{12} \text{ years} / 15 \approx 10^{11} \text{ light years}$.

Both the 0-D phase geometry and cosmological spatial integration independently converge on **3 stable levels per quadrant**, establishing the exact **12-particle spectrum** without arbitrary assumptions.

Chapter 6: Determination of Stable Speeds of Light for the Three Leptons in the First Quadrant

To determine the stable speed of light corresponding to the first energy level - subsequently identified with the electron e^- and the positron e^+ masses along with their corresponding spin states, we take the maximum cycle duration calculated in Paper V (Part I, Eq. 11) as approximately **360** billion years. A more precise calculation yields: $t_{\max} = y / H_0 = 17.9 / (1.569 \times 10^{-18}) \approx 1.14 \times 10^{19}_{\text{sec}} \approx 3.617624 \times 10^{11}_{\text{years}}$

Dividing this value by the full 4π cycle places the initial fundamental level at approximately **28.8** billion years from the onset of oscillation (the boundary point of the universe).

Applying the refined numerical approximations to the values established in Paper V yields an increment of approximately **+0.8%**, fixing this fundamental state (designated as C_0) at **29.027 billion light years**.

Calculation of Subsequent Intrinsic Frequency Levels (C_1 and C_2)

To determine the intrinsic speeds-of-light frequency levels in the first quadrant, we apply the phase scaling relations:

- First Level (C_0 , Level 0): $C_0 = 29.027$ billion light years $\approx T_{\max} / (4\pi) \approx 3.617 \times 10^{11} / (4\pi)$.
- Second Level (C_1 , Level 1): $C_1 = C_0 \times (1 + (8/4) \times \pi) \approx 211.41$ billion light years.
- Third Level (C_2 , Level 2): $C_2 = C_0 \times (1 + (11/4) \times \pi) \approx 279.8$ billion light years.

These discrete intrinsic frequencies (C_0 , C_1 , C_2) serve as the direct geometric foundation for determining the rest mass spectrum of the leptons in Chapter 7.

Trigonometric Continuous Representation These discrete intrinsic frequency levels can be continuously expressed using a sum of trigonometric phase functions (cosine and sine):

$$C(n) = A + B \cos(2\pi \cdot n/3) + C \sin(2\pi \cdot n/3)$$

Boundary conditions demand for the three discrete quadrant levels gives: $C_0 = 29.027$, $C_1 = 211.41$ and $C_2 = 279.8$.

Solving this system yields the exact continuous parameters: $A \approx 173.41$, $B \approx -144.38$, $C \approx -39.49$

Thus, the exact continuous formulation for the geometric frequency spectrum is: $C(n) \approx 173.41 - 144.38 \times \cos(2\pi \cdot n/3) - 39.49 \times \sin(2\pi \cdot n/3)$

This continuous formula confirms that the 0-D oscillator supports a smooth, infinite oscillation, yielding exactly three stable (C_0 , C_1 , C_2) intrinsic frequency levels per quadrant. Across four quadrants, this reproduces the complete **12-lepton** spectrum (electron, muon, tau, and their corresponding antimatter and spin-reversed states), thereby preserving the stability of the intrinsic frequency levels (C_0 , C_1 , C_2) against variations in the ambient speed of light.

Chapter 7: Mass and Intrinsic Frequency of the Oscillator

To derive the intrinsic energy and mass spectrum, we evaluate the system equations using the stable light-speed values (C_0 , C_1 , C_2) established in Chapter 6. Returning to the exponential relationship derived in Equation I (Papers 1, 2, 3a) and substituting $H_0 = \underline{48.41}_{(km/s/Mpc)}$ (Paper II), we have:

$$\cdot \text{Eq 1) } C_{(t)} = e^{K_{(D_0)} \cdot t} - 1 = e^{H_0 \cdot t} - 1$$

Intrinsic Frequency Derivation

Because the intrinsic frequency depends directly only on the speed of light - which varies from zero to its maximum within the first quadrant - we model the intrinsic frequency as a continuous function:

$$\cdot \text{Eq 2) } f_{(C(t))} = C_{max} \times \frac{e^{\alpha_k \times (\frac{C_{(t)}}{C_{max}})} - 1}{e - 1}$$

Where α_k is the calibration factor, discussed in further detail below.

Due to fourfold quadrant symmetry, the intrinsic frequency profile repeats identically across all four quadrants. Reversing the phase trajectory across quadrants yields:

$$f_{\text{expansion}(C(t))} = C_{max} - f_{\text{contraction}(C(t))}.$$

When $f_{\text{expansion}(C(t))}$ represents the frequency evolution in expansion quadrants, and $f_{\text{contraction}(C(t))}$ represents contraction quadrants. Applying this dynamic phase symmetry across all four quadrants by evaluating the 3 specific energy levels of the first quadrant generates the complete, discrete 12-lepton spectrum.

Despite the velocity of light varying down to zero at extreme boundary nodes and up to (C_{max}) at the center of the oscillator, the intrinsic frequencies corresponding to the discrete quadrant levels (C_0 , C_1 , C_2 , denoted as $C_{(t,n)}$ in Equations 3–5), as well as (C_{max}) itself remain fixed over time. Consequently, the rest masses of particles remain invariant, preserving chemistry and particle stability regardless of cosmic light-speed dynamics.

Energy and Mass Calculations

Using Planck's relation $E = h \cdot f$, the energy state for each level is given by:

$$\cdot \text{Eq 3) } E = h \times f_{(C_{(t,n)})} = h \times C_{max} \times \frac{e^{\alpha_k \times (\frac{C_{(t,n)}}{C_{max}})} - 1}{e - 1} \quad (n = 1, 2, 3)$$

Applying $E = m \cdot C^2$, the particle rest mass is formulated as:

$$\cdot \text{Eq 4) } m_n = \frac{E_n}{C_{(t,n)}^2} = \frac{h \times f_{(C_{(t,n)})}}{C_{(t,n)}^2} = \frac{h \times C_{max} \times \frac{e^{\alpha_k \times (\frac{C_{(t,n)}}{C_{max}})} - 1}{e - 1}}{C_{(t,n)}^2} \quad (n = 1, 2, 3)$$

Combining Equations 1 and 4 yields:

$$\cdot \text{Eq 5) } m_n = \frac{h \times C_{max} \times \frac{e^{\alpha_k \times (\frac{e^{H_0 \cdot t_n} - 1}{C_{max}})} - 1}{e - 1}}{(e^{H_0 \cdot t_n} - 1)^2} \quad (n = 1, 2, 3)$$

Quantitative Results and Calibration

Evaluating these dynamic equations yields the precise rest masses and intrinsic frequencies summarized in Table 2:

	Formula used	practical #1	particle #2	Particle #3
Time since the beginning of the quarter (billion years)		29.027	211.41	279.80
Speed of light (light year)	$C_{(t)} = e^{H_0 t} - 1$	3.20492	34,908.5	1,029,528
Frequency (1/light year)	$f_{(C(t))} = C_{max} \times \frac{e^{\alpha_k \times (\frac{C_{(t)}}{C_{max}})} - 1}{e - 1}$	0.00564	61.42	1,811.31
n particle mass	$m_n = \frac{E_n}{C_{(t,n)}^2} = \frac{h \times f_{(C(t,n))}}{C_{(t,n)}^2} \quad (n = 1, 2, 3)$	4.20471E-23	8.63393E-21	1.45369E-19
Mass (Mev)		0.512975	105.334	1,773.498
Measured peer Mass review		0.510999	105.658	1,776.930
The difference between measured and observed mass		0.001976	-0.324448	-3.432428
Percentage difference		0.3852%	-0.3080%	-0.1935%
Identify the particle by name		Electron (e⁻)	Muon (μ⁻)	Tau (τ⁻)

The absolute mass scale is fixed using only a single calibration factor (**$\alpha_k=0.003023$**) applied uniformly across all levels. No other independent calibration is introduced for the muon or tau levels. This single common coefficient directly reflects the geometric proximity to the theoretical base (**$\alpha / e \approx (1/137) / 2.718 \approx 0.002685$** (where α is the fine-structure constant). This led us to find an interesting relation: **$\alpha \approx e^2 / 1,000$** .

This **single calibration** predicts the muon and tau masses within exceptional precisions of **0.30%** and **0.19%**, respectively. A broader context indicates that while general light-speed variations show a baseline calibration of about **0.83%**, the sub-percent precision obtained here confirms that the residual variance is driven purely by cosmological input uncertainties - such as the total baryonic mass (**10^{53} kg**) and the estimated age of the universe (**~ 14 billion years used**).

Furthermore, the **10%–12%** variance observed between **α_k** and the theoretical base (**α / e**) aligns directly with the ratio **$\alpha_s / \beta_s = 2.32/282.9 \approx 0.0082$** (as derived in Chapter 3 of Paper VI), which corresponds directly to **$\alpha \approx 1/137$** . This identity demonstrates that the quantum-scale fine-structure splitting and the cosmic-scale background field uncertainty are dual expressions of the same underlying 0-D oscillator geometry remarkably, these minor background field uncertainties act without disrupting the fundamental geometric stability of the **12-lepton** spectrum.

Conclusions: By unifying cosmic-scale observational constants with the intrinsic geometry of the 0-D harmonic oscillator, this paper completes the structural formulation of the **12** fundamental leptons within the **Theory of Spheres framework**. By demonstrating that spin and matter/antimatter splitting, quadrant capacity limits **$[15/4] = 3$** , and particle rest masses all emerge directly from the geometry of the **0-D oscillator**, we establish a fully deterministic, continuum-based quantum foundation. *(Inter-quadrant coupling forces, quark structures and related phenomena will be presented in Paper VIII).*

[*To the beginning of the paper*](#)