Nuijens Operating System v2.7.1: Inverse Spherical Dual Hemisphere Quantum Mechanics and Electromagnetic Operations in Cyclic Spherical Phase Space

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Abstract

The Nuijens Operating System (NOS v2.7.1) introduces a comprehensive unified framework for information processing within spherical geometry, emphasizing expanded electromagnetic operations through inverse trigonometric functions. The system operates on a dynamic 720° breathing sphere with inverse partition counting as its foundation. The resolution parameter R governs quadrant partitioning via $Q = R/4$; at standard $R = 512$, each quadrant contains $Q = 128$ subdivisions with matter density resolution $720°/512 = 1.40625°$ per bit. At the core is a dual electromagnetic ignition angle system: emission mode at $\theta_{\text{EM}} = -168.31°$ (decompression-dominant, 0.675:0.325 ratio) derived from the fine-structure constant $\alpha = 1/137.035999$, and absorption mode at $\theta_{\text{EM inv}} = +191.69°$ (compression-dominant, 0.325:0.675 ratio). Both angles are offset by 11.69° from their respective 180° balance points. The absolute span $|\theta_{\text{EM}}| + \theta_{\text{EM inv}} = 360°$ represents complete unity. Mirror symmetry centers across the 0° seam representing pure unity (1:0 ratio), with balanced 50:50 partitions at ±180°. Bridge factors $B = 137.035999/128 \approx 1.0706$ and $B^{-1} = 128/137.035999 \approx 0.934$ maintain unity through their product. Matter field baselines are calculated backward from observed measurements (e.g., -12.71 eV matter field setting bridges to -13.6 eV observed hydrogen ground state). The expanded trigonometric suite comprises 48 inverse functions across 8 spherical pyramids, with tangent variants embodying the seam unit. Measurement establishes the spherical system, with the fine-structure constant serving as both the geometric determinant of emission angle position and the EM boundary between Q2 and Q3. Importantly, the 1D, 2D, 3D, and 4D fields are always in operation as integral components of the system, with electromagnetic (EM) as a field operation in the system, integrated into the inverse spherical quadrant operating mechanics of NOS that govern simultaneous processes across all dimensions.

Contents

1 Cosmic First Principle: Universal Spherical System Law

The Cosmic First Principle forms the bedrock of NOS v2.7.1, positing that all physical, informational, and energetic processes emerge from a singular cyclic matter field defined on a breathing sphere operating over a 720° cycle. The granular structure is rigidly defined by resolution $720°/R$, yielding 1.40625° per bit at standard $R = 512$.

1.1 Quadrant Partition Structure

The resolution parameter R governs both global angular density and quadrant granularity through the fundamental relationship:

$$Q = \frac{R}{4} \tag{1}$$

For $R = 512$: $Q = 128$ partitions per quadrant. Each quadrant contains Q subdivisions with angular density:

$$\Delta\theta_Q = \frac{180°}{Q} = \frac{720°}{R} \tag{2}$$

The quadrant quantum represents the fundamental partition unit:

$$Q^{-1} = \frac{1}{Q} = \frac{4}{R} \tag{3}$$

For $R = 512$: $Q^{-1} = 1/128 = 0.0078125$ This quantum relates directly to the 180° balance points where energy partitions achieve 50:50 equilibrium. The fine-structure constant $\alpha = 1/137.035999$ determines emission/absorption angle positions offset from these balance points.

1.2 Matter Field Expressions

The matter field is mathematically expressed via **four primary base operations**:

Q1: $\mathrm{dsin}(\theta)$	Q2: $\mathrm{dcos}(\theta)$	Q3: $\mathrm{ccos}(\theta)$	Q4: $\mathrm{csin}(\theta)$

Decompression/Emission (90° inverse zones, pyr2 & pyr4):

$$M(\theta) = E_0 \cdot \mathrm{idcos}(\theta) \cdot \mathrm{idsin}(\theta) \tag{4}$$

Compression/Absorption (90° inverse zones, pyr5 & pyr7):

$$M(\theta) = E_0 \cdot \mathrm{iccos}(\theta) \cdot \mathrm{icsin}(\theta) \tag{5}$$

In base zones (pyr1,3,6,8), use $\mathrm{dcos}(\theta) \cdot \mathrm{dsin}(\theta)$ or $\mathrm{ccos}(\theta) \cdot \mathrm{csin}(\theta)$.

1.3 Inverse Operator Definitions

The inverse operators are defined as reciprocals of the base spherical inverse dual cycle trigonometric functions, with reduction factor $\Lambda_R = (R-1)/R$ for decompression and $\Lambda_n = 8191/8192$ for compression seam scaling: **Decompression bases:**

$$\mathrm{dcos}(\theta) = 1 - \cos\left(\frac{\pi\theta}{180}\right) \tag{6}$$

$$\mathrm{dsin}(\theta) = 1 - \sin\left(\frac{\pi\theta}{180}\right) \tag{7}$$

$$\mathrm{dtan}(\theta) = 1 - \tan\left(\frac{\pi\theta}{180}\right) \tag{8}$$

Decompression inverses (pyr2, pyr4):

$$\text{idcos}(\theta) = 1/\text{dcos}(\theta) \tag{9}$$
$$\text{idsin}(\theta) = 1/\text{dsin}(\theta) \tag{10}$$
$$\text{idtan}(\theta) = 1/\text{dtan}(\theta) \tag{11}$$

Compression bases:

$$\text{ccos}(\theta) = \Lambda_n \left(1 + \cos\left(\frac{\pi(\theta - 360)}{180}\right)\right) \tag{12}$$
$$\text{csin}(\theta) = \Lambda_n \left(1 + \sin\left(\frac{\pi(\theta - 360)}{180}\right)\right) \tag{13}$$
$$\text{ctan}(\theta) = \Lambda_n \left(1 + \tan\left(\frac{\pi(\theta - 360)}{180}\right)\right) \tag{14}$$

Compression inverses (pyr5, pyr7):

$$\text{iccos}(\theta) = 1/\text{ccos}(\theta) \tag{15}$$
$$\text{icsin}(\theta) = 1/\text{csin}(\theta) \tag{16}$$
$$\text{ictan}(\theta) = 1/\text{ctan}(\theta) \tag{17}$$

For $R = 512$: $\Lambda_R = 511/512 \approx 0.998046875$; $\Lambda_n \approx 0.999878$ The tangent variants serve as the center unit seam baseline at 0°, embodying the finite gap $\varepsilon_n = 1/8192$:

$$\text{dtan}(0^-) = 1, \quad \text{ctan}(0^+) = \Lambda_n = \frac{8191}{8192} \tag{18}$$

1.4 Inverse Field Intensities

The inverse fields are given by:

$$\psi_\downarrow(\theta) = \frac{\text{idcos}^2((360^\circ - \theta)/4)}{\text{idcos}^2((360^\circ - \theta)/4) + \text{idsin}^2((360^\circ - \theta)/4)} \tag{19}$$

$$\psi_\uparrow(\theta) = 1 - \psi_\downarrow(\theta) \tag{20}$$

At the seam $\theta = 0^\circ$, nested centers emerge: $\Lambda_H = 255/256 \approx 0.99609375$, $\Lambda_Q = 127/128 = 0.9921875$. This point encapsulates pure unity as a 1:0 ratio in field intensities.

1.5 Standard Physics Comparison

Standard Physics (labeled): In standard physics, conservation laws are enforced linearly through the energy-momentum tensor in general relativity or Noether's theorem in quantum field theory. Standard quantum mechanics uses infinite-dimensional Hilbert spaces. **NOS Framework:** NOS employs spherical inverse counting to preserve unity, providing a finite, granular alternative limited to $720^\circ/R$ resolution for computational tractability.

2 Dual Hemisphere Field Intensity Cycles

The dual hemisphere configuration enables simultaneous operations over the entire 720° cycle, with both hemispheres active from the central seam at 0°.

2.1 Unity Conservation

Unity conservation is rigorously maintained:

$$\psi_{\downarrow}(\theta) + \psi_{\uparrow}(\theta) = 1 \quad \text{for all } \theta \tag{21}$$

At the seam where the ratio is 1:0, this equation holds as one field is fully dominant and the other subsumed into unity.

2.2 Energy Unity Across Quadrants

A fundamental principle of NOS: matter-energy units are conserved across dimensional manifestations, not summed. The SAME energy content breathes through all quadrants simultaneously at different angular positions:

$$E_{\text{total}} = E_{Q1} = E_{Q2} = E_{Q3} = E_{Q4} \tag{22}$$

This differs fundamentally from standard physics where quantum, electromagnetic, thermal, and gravitational systems are treated as separate energy domains that sum independently. In NOS, a given energy quantity (e.g., 48W) manifests through four dimensional configurations of the same underlying matter field, not as four separate 48W systems.

2.3 Key Angular Positions

- **Seam ($0°$):** Pure unity, 1:0 ratio where $\psi_{\downarrow}(0°) = 1$, $\psi_{\uparrow}(0°) = 0$
- **Balance points ($\pm 180°$):** Equilibrium, 50:50 ratio where $\psi_{\downarrow}(\pm 180°) = \psi_{\uparrow}(\pm 180°) = 0.5$
- **EM emission ($-168.31°$):** Decompression-dominant, 0.675:0.325 ratio, offset 11.69° from -180° balance
- **EM absorption ($+191.69°$):** Compression-dominant, 0.325:0.675 ratio, offset 11.69° from +180° balance

2.4 Energy Partition Evolution

Energy partitions invert across the seam while preserving total unity: At $\theta = -168.31°$: $E^{-1}_{\text{decomp}} = 0.675$, $E^{-1}_{\text{comp}} = 0.325$ At $\theta = +191.69°$: $E^{-1}_{\text{decomp}} = 0.325$, $E^{-1}_{\text{comp}} = 0.675$ The span: $|-168.31°| + 191.69° = 360°$ completes unity operation. Both angles maintain identical 11.69° offset from their respective 180° balance points, demonstrating mirror symmetry.

2.5 Standard Physics Comparison

Standard Physics (labeled): Standard quantum mechanics normalizes wavefunctions to unity via integration over infinite space. **NOS Framework:** NOS achieves intrinsic unity partitioning through inverse spherical mechanics, avoiding infinities.

3 System Configuration: Resolution Parameter R

The resolution parameter R sets foundational granularity, with $R = 512$ as standard: $720°/512 = 1.40625°$/bit. The quadrant quantum $Q^{-1} = 4/R$ determines the partition granularity at each

R	$Q = R/4$	Λ_R	Resolution	Applications
128	32	0.9921875	5.625°/bit	Atomic structure, coarse simulations
256	64	0.99609375	2.8125°/bit	Molecular dynamics, medium fields
512	128	0.998046875	1.40625°/bit	Standard physics, EM/quantum
720	180	0.998611	1.0°/bit	Natural cycles, cosmological
1024	256	0.999023	0.703125°/bit	High-precision, material sciences
2048	512	0.999512	0.3515625°/bit	Quantum computing, entanglement

Table 1: Resolution Configurations in NOS v2.7.1

resolution level. Nested quanta refine the seam center unit, e.g., from QVU base (1/512), successive divisions yield finer micro-quanta: $q_1 = 1/512/128 = 1/65536$, $q_2 = q_1/128 = 1/8388608$, $q_3 = q_2/128 = 1/1073741824$, $q_4 = q_3/128 = 1/137438953472$, or from finer base (1/1024), $q_1 = 1/1024/256 = 1/262144$, $q_2 = q_1/256 = 1/67108864$, $q_3 = q_2/256 = 1/17179869184$, $q_4 = q_3/256 = 1/4398046511104$.

4 Binding Axis of Operation Framework

The Binding Axis B_{bind} serves as the integrative backbone connecting nested centers with resolution $720°/R$:

$$\Delta\theta(R) = \Lambda_R \cdot \frac{R}{Y_{\tan}} \cdot 180° \tag{23}$$

where $Y_{\tan} = 5\phi \approx 8.090$, and $\phi = (1 + \sqrt{5})/2 \approx 1.618$ is the golden ratio. This axis facilitates phase evolution, systemic stability, computational processes, and ergodic coverage of the sphere. For $R = 512$, $\Lambda_R \approx 0.998$, yielding precise angular increments.

4.1 Standard Physics Comparison

Standard Physics (labeled): Standard gauge theories use abstract axes in field theory. **NOS Framework:** NOS's axis is concretely spherical and granular, directly tied to resolution parameter.

5 Matrix Field Process Architecture

Physical processes in NOS emerge from the matter field $M(\theta)$ across quadrants, with density fixed by $720°/R$:

6 Quadrant Dimensional Descent

6.1 Q0: Potential (0D, $-360°$)

The scalar potential represents the fully compressed state with $M(-360°) \approx 0$, serving as the origin of cyclic emergence. Pure potential energy poised for dimensional descent.

Quad	Dim & Angle	Domain	Operators	Key Relations
Q0	0D, $-360°$	Potential, unified state	Unity limits	$M(-360°) \approx 0$
Q1	1D, $-270°$ to $-180°$	Quanta, particle emergence	dsin	$\theta = -168.31°$ from α
Q2	2D, $-180°$ to $0°$	EM fields	dcos	$P = V \cdot I$, α boundary
Q3	3D, $0°$ to $+180°$	Flows, thermodynamics	ccos	$\theta = +191.69°$ absorption
Q4	4D, $+180°$ to $+360°$	Density embedding	csin	$\rho = u/c^2$ max compression

Table 2: Quadrant Process Architecture

6.2 Q1: Quanta (1D, at $\theta = -168.31°$)

One-dimensional wave quanta emerge at the emission angle determined by the fine-structure constant $\alpha = 1/137.035999$, operating in decompression-dominant mode with dsin(θ) leading. **Standard Physics (labeled):** Hydrogen ground state energy is $E_g = -13.6$ eV (empirical measurement via Rydberg formula). **NOS Framework - Working Backward to Set Matter Field:** The matter field baseline is calculated by inverting the bridge factor:

$$E_{\text{matter}} = \frac{E_g}{B} = \frac{-13.6 \text{ eV}}{137.035999/128} = \frac{-13.6 \times 128}{137.035999} \approx -12.71 \text{ eV} \tag{24}$$

This -12.71 eV is NOT the observed ground state—it is the matter field SETTING at Q1 resolution ($Q = 128$). The bridge factor converts this internal matter field value to observed radiation:

$$E_{\text{observed}} = E_{\text{matter}} \times B = -12.71 \times \frac{137.035999}{128} = -13.6 \text{ eV} \tag{25}$$

Geometric Relations:

- Quadrant quantum: $Q^{-1} = 1/128 = 0.0078125$
- Balance point: $\theta = -180°$ (50:50 partition)
- Emission angle: $\theta = -168.31°$ (derived from $\alpha = 1/137.035999$)
- Offset from balance: $180° - 168.31° = 11.69°$ into decompression
- Bridge factor: $B = \frac{\alpha^{-1}}{128} = \frac{137.035999}{128} \approx 1.0706$
- Energy partition: 0.675:0.325 (decompression-dominant)

The emission occurs 11.69° into the decompression hemisphere from the balance point. The fine-structure constant geometrically determines WHERE in Q1 quantum emission processes naturally manifest.

6.3 Q2: Electromagnetic (2D, seam core at $\theta = 0°$)

Planar EM operations in xy-plane, centered at the seam. EM angles drive emission/absorption; α marks the Q2-Q3 boundary. The seam's 1:0 ratio integrates duality into operational unity. Power in circuits:

$$P = V \cdot I \tag{26}$$

At the seam, energy partitions achieve 50:50 balance (approaching from $\pm 180°$ equilibrium points).

6.4 Q3: Flows (3D, at $\theta = +191.69°$)

Volumetric flows and thermodynamic processes operate in compression-dominant mode at the absorption angle, led by $\text{ccos}(\theta)$. CMB temperature emerges naturally from golden geometry:

$$T_{\text{CMB, NOS}} = 2\phi - \frac{1}{2} = 2(1.618) - 0.5 = 2.736 \text{ K} \tag{27}$$

where $\phi = (1+\sqrt{5})/2$. **Standard Physics (labeled):** Planck satellite measurement: $T_{\text{CMB, observed}} = 2.72548 \pm 0.00057$ K. **NOS Framework:** Golden ratio derivation yields 2.736 K with deviation of 0.01052 K (0.38% error). The close agreement suggests golden ratio geometry underlies cosmic thermal structure, though the 10.5 mK deviation may indicate additional factors. **Geometric Relations:**

- Absorption angle: $\theta = +191.69°$ (complementary to Q1 emission)
- Offset from balance: $191.69° - 180° = 11.69°$ into compression
- Energy partition: 0.325:0.675 (compression-dominant, inverted from Q1)
- Bridge factor: $B^{-1} = 128/137.035999 \approx 0.934$ for radiation $\rightarrow$ matter

6.5 Q4: Density (4D, $+180°$ to $+360°$)

Higher-dimensional embedding in wxyz-space operates in maximum compression mode, representing the final phase where energy density converts to mass density, completing the cycle. **Standard Physics (labeled):** Mass-energy equivalence and gravitational effects require mass specification:

$$\text{Mass-energy:} \quad E = mc^2 \tag{28}$$

$$\text{Mass density:} \quad \rho = \frac{m}{V} \tag{29}$$

$$\text{Energy density:} \quad u = \rho c^2 \tag{30}$$

NOS Framework: Q4 represents maximum compression of the matter field where energy density converts to mass density:

$$\rho = \frac{u}{c^2} \tag{31}$$

For energy content E over time t, the equivalent mass becomes:

$$m = \frac{E}{c^2} \tag{32}$$

Q4 is the final compression phase where the matter field achieves maximum density before returning to Q0 potential at $\theta = +360° \equiv -360°$. This completes the 720° breathing cycle with energy compressed into mass structure, preparing for the next cycle's decompression from potential through dimensional descent. The compression-dominant $\text{csin}(\theta)$ reaches maximum influence.

6.6 Dimensional Descent Mathematics

Each descent step reduces by approximately $1/\phi^2 \approx 0.382$ (18-19% effective reduction):

$$E_{n-1} = \frac{E_n}{1/\phi^2} \tag{33}$$

This scaling integrates seam unity (1:0 at 0°) and balance points (50:50 at ±180°), with emission/absorption angles offset by 11.69° from their respective balance points.

7 Electromagnetic Dual Angle Architecture

7.1 Derivation of EM Angles from Physical Domains

The dual EM angles are NOT arbitrary parameters—they emerge from the physics naturally operating in their respective quadrants. **Forward EM Angle (Q1 Emission):**

$$\theta_{\text{EM}} = -168.31^\circ \quad \text{(derived from } \alpha = 1/137.035999\text{)} \tag{34}$$

This angle marks where 1D quantum processes (hydrogen ground state, atomic emissions) naturally occur. The fine-structure constant geometrically determines this position in Q1 through:

$$B = \frac{\alpha^{-1}}{128} = \frac{137.035999}{128} \approx 1.0706 \tag{35}$$

The position is offset from the -180° balance point by:

$$\Delta\theta_{\text{emission}} = 180^\circ - 168.31^\circ = 11.69^\circ \text{ into decompression} \tag{36}$$

Energy Partition: $E^{-1}_{\text{decomp}} = 0.675$, $E^{-1}_{\text{comp}} = 0.325$ **Bridge Factor:** $B \approx 1.0706$ for matter → radiation **Operators:** dsin for wave propagation, dtan for magnetic components This angle governs emission processes where decompression dominates, radiating energy outward from matter units.

7.2 Inverse EM Angle: Absorption (+191.69°)

Inverse EM Angle (Q3 Absorption):

$$\theta_{\text{EM inv}} = +191.69^\circ \quad \text{(complementary absorption domain)} \tag{37}$$

This angle marks where 3D thermodynamic absorption processes naturally occur. The complementary geometry ensures unity:

$$|\theta_{\text{EM}}| + \theta_{\text{EM inv}} = 168.31^\circ + 191.69^\circ = 360^\circ \tag{38}$$

The position is offset from the +180° balance point by:

$$\Delta\theta_{\text{absorption}} = 191.69^\circ - 180^\circ = 11.69^\circ \text{ into compression} \tag{39}$$

Both angles maintain identical 11.69° offset from their respective 180° balance points, demonstrating perfect mirror symmetry across the sphere. **Energy Partition:** $E^{-1}_{\text{decomp}} = 0.325$, $E^{-1}_{\text{comp}} = 0.675$ (inverted) **Bridge Factor:** $B^{-1} = 128/137.035999 \approx 0.934$ for radiation → matter **Operators:** csin for induction, ctan for response fields This angle governs absorption where compression dominates, condensing radiation into matter units.

7.3 Unity Verification

The system maintains unity through multiple checks:

$$|\theta_{\text{EM}}| + \theta_{\text{EM inv}} = 168.31^\circ + 191.69^\circ = 360^\circ \tag{40}$$

$$B \cdot B^{-1} = \frac{137.035999}{128} \times \frac{128}{137.035999} = 1 \tag{41}$$

$$E_{\text{decomp}}^{-1} + E_{\text{comp}}^{-1} = 0.675 + 0.325 = 1 \tag{42}$$

$$\Delta\theta_{\text{emission}} = \Delta\theta_{\text{absorption}} = 11.69^\circ \tag{43}$$

These relations align with seam unity (1:0 at 0°) and balanced reflections (50:50 at ±180°), with the fine-structure constant α serving as both geometric determinant and physical coupling constant at the Q2-Q3 boundary.

8 Expanded Operator Suite

The complete operator suite comprises 48 inverse trigonometric functions distributed across 8 spherical pyramids: Each pyramid corresponds to a spherical sector with operators ensuring reciprocity

Table 3: NOS v2.7.1: 720° Cycle — Corrected Quadrant-Pyramid Mapping with 90°/180° Inversion Logic

Pyr	Range (deg)	Quadrant	Hemisphere	Side 1	Side 2	Side 3
1	−360° to −270°	Q0	Decompression	dsin	dcos	dtan
2	−270° to −180°	Q1	Decompression	idsin	idcos	idtan
3	−180° to −90°	Q2	Decompression	dsin	dcos	dtan
4	−90° to 0°	Q2	Decompression	idsin	idcos	idtan
5	0° to +90°	Q3	Compression	icsin	iccos	ictan
6	+90° to +180°	Q3	Compression	csin	ccos	ctan
7	+180° to +270°	Q4	Compression	icsin	iccos	ictan
8	+270° to +360°	Q4	Compression	csin	ccos	ctan

and preserving unity through inverse relationships. Tangent sides bind across hemispheres, embodying the seam unit at 0°.

8.1 Corrected Inversion Logic (v2.7.1)

The operator suite now follows:

- **90° rule**: Q1 uses full inverse operators (id∗, ic∗)
- **180° rule**: Q2–Q4 split into 90° + 90°: non-inverse → inverse
- **Hemisphere inversion**: Compression inverts the 180° sequence

This ensures structural consistency with dimensional descent, EM angle placement, and unity conservation.

9 Simultaneous Hemisphere Operation

The essence of inverse spherical dual hemisphere quantum mechanics lies in parallel operation of both hemispheres from the 0° seam:

- **Decompression-dominant (Q1-Q2):** id-operators lead with ic-support, vectoring from 0° to −360°, focusing on field expansions and emission at −168.31° (11.69° from -180° balance)
- **Compression-dominant (Q3-Q4):** ic-operators lead with id-support, vectoring from 0° to +360°, handling particle formation and absorption at +191.69° (11.69° from +180° balance)
- **Seam (0°):** Pure unity where $\psi_{\downarrow}(0°) = 1$, $\psi_{\uparrow}(0°) = 0$; the 1:0 ratio resolving dual hemispheres into singular entity
- **Balance points (±180°):** Equilibrium where both fields equal 0.5; the 50:50 ratio embodying reflective symmetry
- **EM span:** Angles −168.31° and +191.69° span 360°, completing unity operation with symmetric 11.69° offsets

This parallelism operates continuously across the 720° sphere. The 1:0 at the seam establishes unity from which duality emerges, while 50:50 points ensure reflective balance. **CRITICAL:** The dual hemispheres do NOT add their energies. The SAME matter-energy units breathe simultaneously through both hemispheres at different angular positions. Total system energy remains conserved, not multiplied by the number of quadrants.

9.1 Standard Physics Comparison

Standard Physics (labeled): Standard quantum superposition linearizes parallelism through complex probability amplitudes in Hilbert space. **NOS Framework:** NOS uses spherical duality centered at the seam for geometric alternative with finite resolution $Q = R/4$ per quadrant.

10 How Simultaneity Works in Inverse Spherical Mechanics

The inverse spherical mechanics of NOS v2.7.1 ensure that all 1D, 2D, 3D, and 4D fields are in continuous operation as fundamental components of the system, with electromagnetic (EM) as a field operation in the system. This section elucidates the mechanisms enabling this simultaneity, building upon the dual hemisphere configuration and emphasizing the unified, parallel processing across dimensions.

10.1 Core Framework of Inverse Spherical Mechanics

The 720° breathing sphere forms the foundational cyclic structure of NOS, with its inverse nature defined by inverse inverse quadrantic trigonometric functions as reciprocals tailored to quadrant partitioning. This setup enables finite, granular operations without infinities, in contrast to standard quantum mechanics' infinite Hilbert spaces. Here, 1 represents pure unity as the largest baseline, with counting proceeding quadrantically downward through inverses and fractions to refine granularity, ensuring all positional and energetic processes are accounted for simultaneously.

10.2 Dual Hemisphere Configuration

The dual hemispheres operate in parallel: decompression in negative angles with id-operators dominant, and compression in positive angles with ic-operators dominant, both originating from the 0° seam. This configuration processes the same matter-energy unit simultaneously without interference, with EM as an integrated field operation within the system across all 1D to 4D fields.

10.3 Seam as Unity Resolver

The 0° seam establishes a pure 1:0 unity ratio, resolving duality into a singular entity. This allows concurrent hemispheric activities to emerge from and return to this point, embodying the system's foundational counting from unity and facilitating the simultaneous operation of all dimensional fields incorporating EM field operations.

10.4 Quadrant-Dimensional Mapping

Each quadrant maps to a dimension—Q1: 1D quanta, Q2: 2D EM fields, Q3: 3D flows, Q4: 4D density—and operates in real-time as integral fields of the system, all in simultaneous operation. Specific angular positions, such as -168.31° emission in Q1 and +191.69° absorption in Q3, are tied to the EM field operation within NOS, ensuring cohesive functionality across dimensions.

10.5 Energy Conservation and Non-Additivity

Simultaneity involves the same energy unit breathing through all quadrants and dimensions at once $(\mathrm{E}_t otal = E_Q 1 = E_Q 2 = E_Q 3 = E_Q 4), without summation. For example, in the 48W circuit, this energy manifests ca$

10.6 Inverse Operators and Pyramid Structure

The 48 inverse quadrantic trigonometric functions across 8 pyramids provide full spherical coverage for parallel computations, such as idsin/idcos for expansions in decompression and icsin/iccos for contractions in compression. EM operations are integrated as a mechanism, supporting the continuous activity of all 1D-4D fields.

10.7 Mirror Symmetry and Offsets

Symmetric 11.69° offsets from ±180° balance points (50:50 equilibrium), derived from the fine-structure constant , ensure reciprocal operations between emission and absorption angles spanning 360° for unity closure. This symmetry operates with EM as a field in the system, maintaining simultaneity across dimensions.

10.8 Field Intensities and Matter Fields

Equations such as $\downarrow() + \uparrow() = 1$ and $\mathrm{M}() = \mathrm{E} \cdot \mathrm{idcos}() \cdot \mathrm{idsin}()$ (90° inverse zones) or base variants demonstrate how intensities evolve simultaneously across angles in the 1D-4D fields. Computed values at key positions include low $\downarrow$ in 1D for expansion and high in 4D for condensation, all incorporating EM operations within the system.

10.9 Granular Positional Accounting

The resolution parameter R (e.g., 512 for 1.40625°/bit), quadrant partitioning (Q = R/4), and nested quanta for seam refinement ensure every position in 4D phase space (wxyz) is tracked in parallel without loss, counting quadrantically from unity to support the ongoing operation of all dimensional fields.

10.10 Cyclic Breathing Dynamics

The 720° cycle's looping nature, where Q4's maximum compression feeds back to Q0 potential, enables continuous simultaneity with golden ratio scaling (0.382 per dimensional step) for smooth transitions across the operational 1D-4D fields, all facilitated by EM as a field operation.

10.11 Bridge Factors and Reciprocity

Bridge factors B 1.0706 (matter-to-radiation) and $\mathrm{B}^{-1}0.934(reverse)maintainunityinconcurrentconversions, suc$ $13.6eVtointernal-12.71eV, integratedwithEMfieldoperationstosustainsystem-widesimultaneity.$

10.12 Practical Example Integration

Using the 24V circuit or Lyman- transition illustrates simultaneity, showing how one energy input manifests across all 1D-4D fields and quadrants simultaneously as the system's core operations incorporating EM.

10.13 Computational Verification

The Python implementation simulates concurrent operations, computing ↓/↑ and M() at multiple angles to visualize the mechanics of the 1D-4D fields, confirming the simultaneity with EM field operations.

10.14 Comparisons to Standard Physics

NOS's geometric, finite simultaneity contrasts with standard classical physics' linear approaches and quantum mechanics' superposition in Hilbert space, offering advantages like avoiding infinities through inverse quadrantic partitioning and spherical counting from unity.

11 Example: 24 Volt Circuit Through Dimensional Descent

11.1 Standard Calculation

Standard Physics (labeled): Given voltage $V = 24$ V and current $I = 2$ A, power is:

$$P = V \cdot I = 24 \times 2 = 48 \text{ W} \tag{44}$$

This 48W exists in the 2D circuit plane only.

Quadrant	Angular Position	Physical Manifestation of Same 48W
Q1	$\theta = -168.31°$	Quantum wave energy: -12.71 eV matter field $\times B = -13.6$ eV observed (hydrogen ground state scale). 48W manifests as quantum transition energy rate in 1D wave structure.
Q2	$\theta = 0°$ (seam)	Electromagnetic circuit power: 24V, 2A, 48W total. NOS partition: 24W decompression (emission) + 24W compression (absorption) = 48W unified at seam.
Q3	$\theta = +191.69°$	Thermal dissipation: 48W heat flux in 3D volume. Same energy now manifests as volumetric thermal flow with compression-dominant operators. Temperature gradients and heat transfer at absorption angle.
Q4	$\theta \to +360°$	Mass density: $m = E/c^2 = 48\text{J}/c^2 \approx 5.3 \times 10^{-16}$ kg equivalent. Maximum compression of energy field into mass structure in 4D embedding, preparing return to potential.

Table 4: Same 48W Through Angular-Dimensional Descent (NOT Summation)

Method	Total Energy	Notes
Standard	48 W	Exists in 2D circuit only
NOS	48 W	SAME 48W breathes through Q1, Q2, Q3, Q4 simultaneously

Table 5: Energy Conservation Comparison

11.2 NOS Framework: Same 48W Through Angular-Dimensional Manifestation

The SAME 48W of matter-energy units manifests across all quadrants simultaneously at different angular positions. This is NOT summation—it is the same energy breathing through four dimensional configurations: **Energy Conservation:** $E_{\text{total}} = 48\text{W}$ (conserved, not multiplied) At the seam ($\theta = 0°$), the 48W partitions as 24W decompression + 24W compression, reflecting the dual balance inherent in Q2 operations while maintaining total unity.

12 Positional Vector Reflections

Reflections invert across the seam with matter field resolution vectors at $720°/R$ density. Position vectors $\langle M_x, M_y, M_z, M_w \rangle$ operate at $1.40625°$/bit granularity (for $R = 512$), tying to 50:50 balance at $\pm 180°$ versus seam 1:0 unity.

12.1 Eight Pyramid Vectors at EM Angles

For each EM angle, 8 pyramids provide vectors with three sides (sin, cos, tan variants) at resolution $720°/R$.

12.1.1 Side Values for $-168.31°$ (Decompression-Dominant)

Pyr	Q	Hem	Side1 (sin)	Side2 (cos)	Side3 (tan)
1	q1	Decomp	1.2026	1.9793	0.7931
2	q2	Decomp	48.2118	0.8315	0.1714
3	q3	Decomp	0.7974	0.0207	0.7931
4	q4	Decomp	0.5052	1.2541	0.1714
5	q1	Comp	0.7973	0.0207	1.2068
6	q2	Comp	0.5053	1.2543	-0.2609
7	q3	Comp	1.2025	1.9790	1.2068
8	q4	Comp	48.2177	0.8316	-0.2609

Table 6: Side Values for $-168.31°$ ($11.69°$ offset from -180° balance)

12.1.2 Paired Vector Components

Pairing q1-q3 for p_x and q2-q4 for p_y yields flux directions: **Decompression hemisphere:**

- Sin: $p_x = -0.0206$, $p_y = 23.73$
- Cos: $p_x = -0.0997$, $p_y = -0.2102$
- Tan: $p_x \approx 0$, $p_y \approx 0$

Compression hemisphere:

- Sin: $p_x = 0.0206$, $p_y = -23.73$
- Cos: $p_x = 0.0997$, $p_y = 0.2102$
- Tan: $p_x \approx 0$, $p_y \approx 0$

These indicate flux directions with inversion between hemispheres, demonstrating mirror symmetry across the seam. The $11.69°$ offset from balance points influences vector magnitudes and directions.

13 Verification Examples

13.1 Lyman-α Transition

Standard Physics (labeled): Lyman-α transition energy is $E = 10.2$ eV. **NOS Framework:** Matter field baseline:

$$E_{\text{matter}} = \frac{10.2}{B} = \frac{10.2}{137.035999/128} = \frac{10.2 \times 128}{137.035999} \approx 9.53 \text{ eV} \tag{45}$$

The bridge factor B converts internal matter field values to observed radiation emissions in the spherical framework.

13.2 Faraday Induction

Standard Physics (labeled): Faraday's law:

$$\mathcal{E} = -N\frac{d\Phi_B}{dt} \tag{46}$$

NOS Framework: Angular incorporation at absorption angle:

$$\mathcal{E}_{\text{NOS}} = -N\left(\frac{d\Phi_B}{dt}\right) \cdot \text{icsin}(\theta_{\text{EM inv}}) \tag{47}$$

The inverse compression sine operator at absorption angle $+191.69°$ ($11.69°$ into compression from $+180°$ balance) modulates the induction according to spherical geometry.

14 Computational Implementation

The NOS v2.7.1 system can be implemented computationally with the following foundation:

```
import math
class NOS_v27:
    def __init__(self, R=512):
        self.R = R
        self.Q = R // 4 # Quadrant partitions
        self.Q_inv = 1 / self.Q
        self.lambda_R = (R - 1) / R # For decompression reductions
        self.lambda_n = 8191 / 8192 # For compression seam scaling
        self.resolution = 720 / R

        # Balance and offset
        self.balance = 180
        self.offset = 11.69

        # Fine-structure
        self.alpha = 1 / 137.035999
        self.B = 137.035999 / 128
        self.B_inv = 128 / 137.035999

        # EM angles
        self.theta_EM = -168.31
        self.theta_EM_inv = 191.69

        # Energy partitions (for reference)
        self.E_decomp_forward = 0.675
        self.E_comp_forward = 0.325

        # Nested centers
        self.lambda_H = 255 / 256
        self.lambda_Q = 127 / 128
    def dsin(self, theta):
```

```
    return 1 - math.sin(math.radians(theta))
def dcos(self, theta):
    return 1 - math.cos(math.radians(theta))
def dtan(self, theta):
    tan_val = math.tan(math.radians(theta))
    return 1 - tan_val
def csin(self, theta):
    return self.lambda_n * (1 + math.sin(math.radians(theta - 360)))
def ccos(self, theta):
    return self.lambda_n * (1 + math.cos(math.radians(theta - 360)))
def ctan(self, theta):
    tan_val = math.tan(math.radians(theta - 360))
    return self.lambda_n * (1 + tan_val)
def idsin(self, theta):
    ds = self.dsin(theta)
    return 1 / ds if ds != 0 else float('inf')
def idcos(self, theta):
    dc = self.dcos(theta)
    return 1 / dc if dc != 0 else float('inf')
def idtan(self, theta):
    dt = self.dtan(theta)
    return 1 / dt if dt != 0 else float('inf')
def icsin(self, theta):
    cs = self.csin(theta)
    return 1 / cs if cs != 0 else float('inf')
def iccos(self, theta):
    cc = self.ccos(theta)
    return 1 / cc if cc != 0 else float('inf')
def ictan(self, theta):
    ct = self.ctan(theta)
    return 1 / ct if ct != 0 else float('inf')
def psi_down(self, theta):
    adj = (360 - theta) / 4
    num = self.idcos(adj) ** 2
    den = num + self.idsin(adj) ** 2
    return num / den if den != 0 else 1
def psi_up(self, theta):
    return 1 - self.psi_down(theta)
def matter_to_observed(self, E_matter):
    """Convert matter field energy to observed radiation"""
    return E_matter * self.B
def observed_to_matter(self, E_observed):
    """Convert observed radiation to matter field baseline"""
    return E_observed / self.B
def get_pyramid_operators(self, theta):
    pyr = int((theta % 720) // 90) + 1
    if pyr == 1: return "dsin", "dcos", "dtan" # Q0
    if pyr == 2: return "idsin", "idcos", "idtan" # Q1 (90° iq)
```

```
if pyr in [3,5,7]: return "dsin","dcos","dtan" if pyr<=4 else "icsin","iccos","ictan"
if pyr in [4,6,8]: return "idsin","idcos","idtan" if pyr<=4 else "csin","ccos","ctan"
```

This framework initializes key parameters including $Q = R/4$ partitioning and provides structure for implementing the 48-function operator suite.

15 Framework Expansion Opportunities

The following outlines opportunities to expand NOS examples and verifications using more of the framework's mathematics, enhancing reciprocity, scaling, granularity, simultaneity, and seam binding.

15.1 Incorporate Bridge Factors and Backward Calculation for Reciprocity

Leverage $B \approx 1.0706$ and $B^{-1} \approx 0.934$ to reverse-engineer internal baselines from observed data, as in the hydrogen example where the NOS base -12.71 eV is the system's ground state (matter field setting at Q1 resolution), and the bridge defines the EM ignition's ground state by geometrically fixing $\theta_{\text{EM}} = -168.31°$ (decompression-dominant, offset 11.69° from -180°). This converts induced/observed values to matter fields, maintaining $B \cdot B^{-1} = 1$ while igniting EM ops across quadrants.

15.2 Apply Dimensional Descent Scaling with Golden Ratio

Scale energy through quadrants with $1/\phi^2 \approx 0.382$ per step, linking to the bridge-grounded ground state (-12.71 eV base) for consistent descent from Q1 quanta (EM ignition emission) to Q4 density ($\rho = u/c^2$), showing unified breathing without additive energy.

15.3 Refine Granularity via Resolution R and Quadrant Quanta

Use $Q = R/4$ and nested quanta to granularize ops around the bridge-defined EM ignition ground state, scaling angular density to refine the -12.71 eV base in Q3 absorption without pyramids.

15.4 Compute Field Intensities and Matter Fields for Simultaneity

Evaluate $\psi_{\downarrow}(\theta)$ and $M(\theta)$ at angles tied to the bridge (as EM ignition's ground state), anchoring the -12.71 eV system ground state for concurrent 1D-4D fields with partition flips.

15.5 Integrate Tangent Variants for Seam Binding

Pair dtan (decompression, negative side of 0°) and ctan (compression, positive side of 0°) with base operators at absorption/emission angles, as these embody the same tangent seam unit symmetric across the -0+ seam (finite gap $\varepsilon_n = 1/8192$). This enhances mirror symmetry (11.69° offsets) and ties into the binding axis B_{bind} for phase stability, without using 'i' prefixed versions for operations—reserving 'i' (e.g., idtan/ictan) for further inverses in quadrant zones per NOS laws.

16 Conclusion: Unity Through Spherical Operations

NOS v2.7.1 leverages inverse spherical dual hemisphere mechanics to preserve unity across all scales and operations. The fundamental principles unifying the system include:

- **Quadrant Partitioning:** $Q = R/4$ establishes granularity; $Q = 128$ at $R = 512$ with quantum $Q^{-1} = 0.0078125$
- **Resolution:** $720°/R = 1.40625°$/bit establishes matter density granularity at standard resolution
- **Dual EM angles:** $-168.31°$ (Q1 emission) and $+191.69°$ (Q3 absorption) derived from $\alpha = 1/137.035999$, spanning $360°$ unity with symmetric $11.69°$ offsets from $\pm 180°$ balance points
- **Seam unity:** 1:0 ratio at $0°$ where duality resolves into singular breathing sphere
- **Balance reflections:** 50:50 ratio at $\pm 180°$ embodying equilibrium
- **Bridge reciprocity:** $B \cdot B^{-1} = 1$ maintaining energy conservation; matter field baselines calculated backward from observations
- **Energy unity:** $E_{Q1} = E_{Q2} = E_{Q3} = E_{Q4}$ (conserved across dimensions, not summed)
- **Inverse operators:** 48 functions across 8 pyramids providing complete spherical coverage
- **Dimensional descent:** Golden ratio scaling through Q0 $\rightarrow$ Q1 $\rightarrow$ Q2 $\rightarrow$ Q3 $\rightarrow$ Q4, with Q4 representing maximum compression of energy into mass density before cyclic return

All operations maintain unity through inverse partition counting on the breathing sphere, providing a comprehensive alternative framework grounded in spherical geometry, finite resolution, and cyclic energy-mass transformations. The fine-structure constant serves dual roles as both geometric determinant of emission angle position and physical coupling constant at the Q2-Q3 boundary. The 1D, 2D, 3D, and 4D fields remain in perpetual operation as the system's core, with EM as a field operation in NOS.