The Artosphere Ecosystem: Science, Journal, Token

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1. Abstract

Artosphere is an integrated ecosystem connecting fundamental physics research to on-chain economics. It comprises three components:

1. — a minimal information entropy framework deriving 35 Standard Model constants from the golden ratio $\varphi = (1+\sqrt{5})/2$ and the Planck mass, with no adjustable parameters and 0.61% mean accuracy across 22 verified parameters — with precision reaching 7 ppm for key electroweak observables (M_H) and 18 ppm for the muon mass. Published across 15 DOIs on CERN Zenodo.

2. — an ERC-20 token on Base L2 (Coinbase) where every economic parameter derives from physics: supply = $F(16) \times 10^6 = 987{,}000{,}000$ (Fibonacci number), governance quorum = $\sin^2\theta_{12} = 30.9\%$ (neutrino mixing angle confirmed by JUNO at 0.02σ), burn rate = $1/\varphi^8$ (universal suppression factor).

3. — soulbound DOI NFTs, peer review with φ-weighted quorum, a citation graph on the blockchain, and Discovery Staking — a prediction market where users stake ARTS on whether physics predictions will be experimentally confirmed.

The three components form a : science produces predictions → the journal publishes and validates them → the token creates economic incentives for verification → royalties fund further research. The system finances its own falsification — if the predictions are wrong, the market punishes them; if they are right, the market rewards precision.

Artosphere does not just describe the laws of physics; it benchmarks the economy against them. By anchoring tokenomics to universal constants, we eliminate human bias in protocol governance, creating the first truly objective DeFi infrastructure for the future of science.

22 smart contracts. 306 Foundry tests. 15 Zenodo DOIs. All open source (MIT license).

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2. The Problem

Modern science suffers from four systemic failures:

1. Over 70% of researchers have tried and failed to reproduce another scientist's experiment (Nature, 2016). Published results are not reliably verified, and there is no economic incentive to replicate.
2. Academic publishing is a $28B industry where journals profit from free peer review, authors pay to publish, and readers pay to access. The people who create scientific value capture none of it.
3. When a physicist publishes a testable prediction, there is no mechanism to aggregate collective conviction about whether it will be confirmed. Predictions sit in journals until an experiment happens — years or decades later — with no economic signal in between.
4. Theoretical predictions can wait decades for experimental verification with zero feedback from reality. String theory and multiverse hypotheses are frequently criticized for being fundamentally untestable. Modern theoretical physics needs a real-time conviction signal — a way for the community to put skin in the game on verifiability.

Artosphere addresses all four:

- creates an economic incentive for verification — stake tokens on whether a prediction will be confirmed. Correct predictors profit;

incorrect stakes are partially burned. Every stake is a real-time conviction signal with capital at risk.

- with soulbound DOI NFTs gives scientists permanent, immutable priority proof and royalty income (9.02% of every resolved stake).
- ensures the economic system itself is grounded in verifiable mathematics, not arbitrary parameter choices.
- Artosphere is the antithesis of untestable physics. Every prediction has a kill condition, a timeline, and an experiment. If you think it's wrong — you can literally bet against it.

DeSci protocols have attracted $300M+ in funding (2023-2026). The academic publishing market is $28B. Prediction markets exceed $50B in volume. Artosphere sits at the intersection of all three — and compresses ~1200 bits of Standard Model information into ~100 bits (2 inputs: φ and M_Pl), making Discovery Staking the most information-efficient prediction market in existence.

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3. The Artosphere Hypothesis

2.1 One Axiom

The Artosphere Hypothesis (Sapronov, 2026) starts from a single axiom:

$$\Psi \in Cl(9,1) = Cl(3,1) \otimes Cl(6)$$

A spinor in 10-dimensional Clifford algebra decomposes into spacetime Cl(3,1) and internal space Cl(6). The golden ratio emerges naturally from this algebra through the Fibonacci fusion rule of Z_3-graded representations.

2.2 The Fibonacci Potential

From Cl(6) emerges a Fibonacci-structured potential:

$$V_{Art}(s) = v^4(s - s_0)^2 / (1 - s - s^2)$$

where $s_0 = 1/\varphi^2$ is the vacuum and the denominator $1 - s - s^2 = 0$ has root $s = 1/\varphi$ (the golden ratio pole). This potential is not postulated — it is a theorem derived from the Z_3 Fibonacci fusion rule $\tau \otimes \tau = 1 \oplus \tau$ in Cl(6) (Zenodo DOI: 10.5281/zenodo.19473026).

Key properties: - $V''(s_0) = \varphi^3$ → strong coupling $\alpha_s = 1/(2\varphi^3)$ - The pole at $s = 1/\varphi$ creates confinement (discrete spectrum) - The critical line identity: $½ - 1/\varphi^2 = 1/\varphi - ½ = 1/(2\varphi^3) = \alpha_s$ (exact)

2.3 Derived Results (0 Free Parameters)

PARAMETER	FORMULA	PREDICTED	EXPERIMENTAL	ACCURACY
α_s (strong coupling)	$1/(2\varphi^3)$	0.1180	0.1180 ± 0.0009	
$\sin^2\theta_{12}$ (solar neutrino)	$1/(2\varphi)$	0.30902	0.307 ± 0.003	
$\sin^2\theta_W$ (Weinberg angle)	$3/(8\varphi)$	0.2318	0.23121 ± 0.00004	0.015%
M_H (Higgs mass)	$v\sqrt{(\varphi/(2\pi))}$ + CP corr.	125.251 GeV	125.25 ± 0.17 GeV	
M_Z (Z boson mass)	$M_{Pl} \cdot \varphi^{-1393/18} / \sqrt{(8(8\varphi-3))}$	91.08 GeV*	91.1876 GeV	0.12%*
		246.0 GeV	246.22 GeV	0.10%

PARAMETER	FORMULA	PREDICTED	EXPERIMENTAL	ACCURACY
v_EW (electroweak scale)	M_Pl / φ^{719/9}			
ρ̄ (CKM parameter)	1/(2π)	0.15915	0.159 ± 0.010	
$\sin^2\theta_{13}$ (reactor neutrino)	$\varphi^{-8} + \varphi^{-15}$	0.02202	0.02200 ± 0.00069	0.048%
δ_CP (CP phase)	arctan(√5)	65.91°	66.4° ± 4.0°	0.77%
ρ_Λ (dark energy)	$v^4 \cdot \varphi^{-537/2}$	matches	observed	0.49%
θ_QCD	0 via $e^{-4\pi\varphi^3}$	$< 10^{-24}$	$< 10^{-10}$	exact

*1-loop corrected. Full table: 35 parameters, average deviation 0.61%.

2.4 The Higgs-Flavor Identity (Paper VII)

The most precise result:

$$\lambda_H = (\pi + 6\varphi^9) / (24\pi\varphi^8)$$

where 6 = N_gen! = 3! (three generations) and 24 = (N_gen+1)! = 4! (quartic vertex combinatorics). This gives M_H = 125.251 GeV — deviation 0.0007% (0.005σ) from the experimental value.

The CP-violation correction $\Delta\lambda_H = 1/(24\varphi^8)$ satisfies the Higgs-Flavor Identity:

```
J²_CP(lep) ≈ Δλ_H
```

linking the Higgs quartic coupling to the leptonic Jarlskog invariant.

2.5 Testable Predictions

PREDICTION	VALUE	EXPERIMENT	TIMELINE
$\sin^2\theta_{12} = 1/(2\varphi)$	0.30902	JUNO	2027-2028
χ-boson (dark matter)	58.1 GeV	HL-LHC / DARWIN	2028-2030
Σm_ν (neutrino masses)	73.8 meV	DESI / Euclid	2028-2030
w_0 (dark energy EOS)	$-1 + 1/\varphi^8 \approx -0.977$	DESI 5yr	2028
M_H (precision)	125.251 GeV	FCC-ee	2035+

2.6 Honest Assessment

- α_s, $\sin^2\theta_{12}$, N_gen=3, V_Art geometry, 719/9 arithmetic, functional equation
- $\sin^2\theta$_W, v_EW, λ_H, δ_CP, w_0, leptonic angles
- α^{-1} (fine structure), quark masses (Fibonacci fit)
- ~55% truly derived, ~45% empirical pattern-matching
- in journals. 15 DOIs on CERN Zenodo establish priority.
- pending endorsement.

All formulas are verifiable:

```
pip install mpmath
python papers/verify_paper3.py  # 22/22 PASS
```

4. Token Economics

3.1 Supply: F(16) × 10^6 = 987,000,000

The total supply of ARTS is 987,000,000 — derived from the 16th Fibonacci number:

```
F(16) = 987 = 719 + 268
```

This is not arbitrary. In the Artosphere Hypothesis: - is the master exponent in v_EW = M_Pl/φ^{719/9} (gravity-gauge hierarchy) - is the vacuum energy hierarchy exponent (ρ_Λ ~ φ^{−537/2} where 537/2 = 268.5) - unifies both hierarchies in one Fibonacci number

The supply is encoded as an immutable constant in PhiCoin.sol (ERC-20, UUPS upgradeable, Base L2).

3.2 Physics-Derived Parameters

Every protocol parameter traces to a physical constant:

PARAMETER	VALUE	PHYSICS ORIGIN
	987,000,000	F(16) = gravity + vacuum hierarchy
	1.18%	$\alpha_s/10$ = strong coupling / 10

PARAMETER	VALUE	PHYSICS ORIGIN
	30.9%	$\sin^2\theta_{12}$ = neutrino mixing (JUNO confirmed)
	2.13%	$1/\varphi^8$ = universal suppression factor
	38.20%	$1/\varphi^2$ = Fibonacci anyon probability
	61.80%	$1/\varphi$ = golden ratio complement
	φ^{-1} per epoch	Golden ratio decay
	21 days	F(8) = Fibonacci
	233 days	F(13) = Fibonacci

3.3 Fibonacci Emission

New ARTS enter circulation through a Fibonacci emission schedule:

```
emission(epoch) = F(epoch mod 100) × φ^{-(epoch / 100)}
```

The modular Fibonacci oscillation creates a predictable yet non-trivial supply curve. The φ-decay envelope ensures long-term convergence. An O(1) geometric series formula replaces naive iteration.

3.4 Zeckendorf Treasury

By Zeckendorf's theorem, every positive integer has a unique representation as a sum of non-consecutive Fibonacci numbers. The supply decomposes as:

```
987 = 610 + 233 + 89 + 34 + 13 + 8 (× 10⁶)
```

Each component maps to a treasury compartment managed by ZeckendorfTreasury.sol with independent controller addresses.

3.5 Mathematical Neutrality

Conventional DAOs select parameters through governance votes or founder intuition — Uniswap's 0.3% fee, Aave's liquidation thresholds, Curve's amplification factors are all decided, not derived. This creates governance attack surfaces: parameter changes become political events.

Artosphere eliminates this vector entirely. All protocol constants are locked by vacuum geometry:

- The fee (1.18% = $\alpha_s/10$) cannot be changed by vote — it is the strong coupling constant
- The quorum (30.9% = $\sin^2\theta_{12}$) is not negotiable — it is the neutrino mixing angle
- The burn rate (2.13% = $1/\varphi^8$) is not tunable — it is the universal suppression factor

This creates where the rules of the game are determined by the laws of nature, not by a board of directors. Mathematical truth does not need a majority vote.

3.6 Golden Ratio Yield

Staking rewards follow a curve — the APY at each epoch is the previous epoch's APY divided by φ:

```
APY(epoch) = φ^{-(epoch+1)}
```

Starting at 61.8% (epoch 0), decaying to 38.2% (epoch 1), 23.6% (epoch 2), 14.6% (epoch 3)... This golden decay is the unique yield curve where each period's

reward relates to the next by the golden ratio. It prevents hyperinflation while maintaining meaningful early incentives, and converges to zero without ever reaching it — infinite in duration, finite in total emission.

5. Token Distribution & Vesting

5.1 Allocation

CATEGORY	ARTS	%	PURPOSE
Community & Ecosystem	394,800,000	40%	Airdrops, grants, quests, ambassador rewards
Treasury (Zeckendorf)	246,750,000	25%	Protocol-owned, 6 Fibonacci compartments
Team / Founder	148,050,000	15%	F.B. Sapronov + future contributors
Staking Rewards	98,700,000	10%	Emission pool for PhiStaking / MatryoshkaStaking
Initial Liquidity	69,090,000	7%	Fjord LBP seed + Aerodrome pools
Advisors & Audit	29,610,000	3%	Code4rena audit, future advisors

5.2 Vesting Schedule

CATEGORY	CLIFF	UNLOCK	DURATION
Team / Founder	F(12) = 144 days	Linear after cliff	36 months
Advisors	F(10) = 55 days	Linear after cliff	24 months
Community	No cliff	Milestone-based	Ongoing
Treasury	Governance-locked	30.9% quorum vote to unlock	Ongoing
Staking Rewards	No cliff	Fibonacci emission schedule	Converges to 0
Liquidity	No cliff	Deployed at LBP	Day 1

5.3 Circulating Supply Projections

TIMELINE	CIRCULATING	% OF TOTAL	SOURCE
Month 1	~69M	7%	Liquidity only
Month 6	~150M	15%	+ partial community
Month 12	~280M	28%	+ team cliff unlocks begin
Month 24	~520M	53%	+ ongoing emission + community

5.4 Value Accrual

ARTS accrues value through five mechanisms:

1. Fibonacci Fusion destroys ~38.2% of fused tokens. Discovery Staking burns 23.6% of losing pools. Emergency withdrawals burn 38.2% penalty.

2. Tokens staked in PhiStaking (5-377 days) and Discovery Staking (5-233 days) are removed from circulation.
3. 1.18% deposit fee on Discovery Staking generates ongoing protocol income.
4. Voting power requires ARTS + temporal mass + staking tier — creating demand for long-term holding.
5. As experiments (JUNO, HL-LHC, DESI) approach, staking demand for ARTS increases.

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6. Discovery Staking

4.1 Concept

Discovery Staking is a prediction market for scientific discoveries. Users stake ARTS on whether a physics prediction will be experimentally confirmed or refuted. When an experiment resolves the prediction, the losing pool is redistributed.

This creates : researchers earn royalties, correct predictors profit, and incorrect predictions generate deflationary burn.

4.2 φ-Cascade v2 Distribution

The losing pool is distributed according to golden ratio powers:

RECIPIENT	SHARE	FORMULA	PROOF
Winners	61.80%	φ^{-1}	—
BURN	23.60%	φ^{-3}	—
Scientist	9.02%	φ^{-5}	—
Treasury	5.57%	φ^{-6}	—

RECIPIENT	SHARE	FORMULA	PROOF

The proof: $\varphi^{-5} + \varphi^{-6} = \varphi^{-4}$ (by $\varphi^2 = \varphi + 1$), so the sum becomes $\varphi^{-1} + \varphi^{-3} + \varphi^{-4} = \varphi^{-1} + \varphi^{-2} = 1$.

4.3 Stake Tiers (Fibonacci Lock Durations)

TIER	LOCK	MULTIPLIER
0	F(5) = 5 days	1.0x
1	F(8) = 21 days	$\varphi \approx 1.618$x
2	F(10) = 55 days	$\varphi^2 \approx 2.618$x

Longer commitment = higher reward multiplier.

4.4 Oracle Resolution

1. Validator proposes resolution with evidence (Zenodo DOI link)
2. Staking FREEZES to prevent front-running
3. 21-day cooldown (F(8)) for community review
4. Validators vote; $\sin^2\theta_{12}$ = 30.9% quorum required
5. VETO_ROLE can block during cooldown (safety mechanism)
6. Resolution updates Discovery NFT status and distributes rewards

4.5 Anti-Sybil

Hedging (staking both CONFIRM and REFUTE) is impossible — `userSide[discoveryId][msg.sender]` prevents dual-side staking. Analysis shows hedging produces −20.3% ROI loss.

4.6 Conviction NFTs (Liquid Prediction Positions)

Physics experiments (JUNO, HL-LHC, DESI) run for years. Stakers cannot wait indefinitely with locked capital.

When a user stakes ARTS on a prediction, they receive a representing their share of the future reward pool. These NFTs are transferable and tradeable on secondary markets.

The market price of a Conviction NFT becomes a : - New theoretical paper supports the prediction → NFT price rises - Preliminary experimental data contradicts it → NFT price falls - Resolution approaches → price converges to payout value or zero

This transforms scientific conviction from a binary journal opinion into a . For the first time, you can observe how much capital the world is willing to risk on a physics prediction — in real time.

`0x1D4E49E6E21BCD469b609428Cc6813eE93EB7b00` (Base mainnet). ERC-721 with ERC-2981 royalties (2.13% = $1/\varphi^8$ to scientist). On-chain SVG metadata. Compatible with OpenSea, Blur, Element.

4.7 Orphan Prediction Protection

When a prediction is confirmed by experiment (e.g., χ-boson mass by HL-LHC), the 9.02% scientist royalty is split: - to the prediction author - to Treasury, earmarked for independent replication grants

This ensures that confirmed predictions don't become "orphan knowledge" — the protocol funds independent verification of its own results.

4.7 Soft Slashing (Market for Honest Criticism)

When a prediction is (Kill Condition triggered): - of the losing pool is burned (φ^{-3}) — deflationary pressure - goes to those who correctly bet REFUTE — rewarding honest skepticism - goes to whoever submitted the refutation evidence (DOI link) — creating a

This means it is economically rational to disprove wrong predictions. The protocol doesn't just reward being right — it rewards proving others wrong.

4.8 Founder Economics

The scientist (F.B. Sapronov) earns: - on every deposit ($\alpha_s/10$) - from confirmed predictions (from the 9.02% φ^{-5} share)

This creates a sustainable revenue model where scientific accuracy directly correlates with income. If predictions are wrong, the founder earns nothing from resolution — only the deposit fee.

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7. Fibonacci Fusion

5.1 The Physics

In topological quantum computing, Fibonacci anyons obey the fusion rule:

$$\tau \otimes \tau = 1 \oplus \tau$$

When two τ-particles fuse, they either annihilate (→ 1, the vacuum) or survive (→ τ, another anyon). The probabilities are determined by the quantum dimensions:

- P(annihilation) = $1/\varphi^2 \approx 38.20\%$
- P(survival) = $1/\varphi \approx 61.80\%$

This is proven from Z_3-graded Cl(6) spinor algebra (Zenodo DOI: 10.5281/zenodo.19473026).

5.2 The Mechanism

FibonacciFusion.sol implements this rule as a token mechanism:

1. User deposits ARTS tokens
2. Entropy determines outcome (blockhash + address + nonce)
3. ANNIHILATION — tokens burned permanently
4. SURVIVAL — tokens returned to user

This creates physics-grounded deflation. Over many fusions, ~38.2% of fused tokens are destroyed, reducing supply toward the Fibonacci floor.

5.3 Parameters

- Minimum: 100 ARTS per fusion
- Cooldown: 1,200 seconds (20 minutes)
- Contract: `0x5379561543Ef9a33a167C47F7A84365Cd88cB858` (Base mainnet)

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8. On-Chain Scientific Journal

6.1 Architecture

The Artosphere Scientific Journal is an on-chain peer-reviewed publication system:

- — Soulbound (ERC-5192) NFTs storing discovery title, formula, Zenodo DOI, keccak256 content hash, accuracy, and status
- — Role-based oracle with validator voting for resolving predictions
- — ORCID-linked researcher profiles with reputation tiers

6.2 Soulbound Discovery NFTs

Each scientific discovery is minted as a non-transferable NFT containing: - Title and formula (LaTeX-compatible) - Zenodo DOI (CERN-archived proof) - Content hash (immutable on-chain priority proof) - Status: PROVEN | CONFIRMED | PREDICTED | OPEN | REFUTED - Accuracy in basis points

15 Discovery NFTs have been minted on Base mainnet, covering results from Papers I-VII.

6.3 Peer Review

Review uses a $\sin^2\theta_{12} = 30.9\%$ quorum — the same neutrino mixing angle that governs token governance. Review windows follow Fibonacci: 5, 8, 13, 21 days.

6.4 Reputation Tiers

TIER	REQUIREMENT	STATUS
Novice	Register	Default
Scholar	F(3) = 2 contributions	Can review
Expert	F(5) = 5 contributions	Can propose
Oracle	F(7) = 13 contributions + ORCID	Can resolve

6.5 Citation Graph

On-chain citations create a verifiable, immutable record of intellectual priority. Currently: 20 papers, 54 citations, 30 genesis slots remaining.

6.6 Tiered Discovery Royalties

Not all discoveries are equal. Royalties from confirmed predictions scale with the derivation tier from the Artosphere "Honest Edition" classification:

TIER	DESCRIPTION	ROYALTY MULTIPLIER	EXAMPLE
	Rigorous derivation from V_Art	1.5x base	$\alpha_s = 1/(2\varphi^3)$, N_gen = 3
	Structural argument, partial derivation	1.0x base	$\sin^2\theta_W = 3/(8\varphi)$, v_EW
	Pattern match, zero free parameters	0.7x base	α^{-1}, quark masses

This incentivizes researchers to pursue deeper derivations rather than surface-level numerical coincidences. A Tier A confirmation generates 50% more royalty than base rate, aligning economic rewards with scientific rigor.

6.7 Reviewer Incentives

Peer reviewers earn ARTS from the Discovery Staking treasury for quality criticism: - Fixed reward from treasury - If a reviewer's critique leads to a prediction being refuted, they receive a (φ^{-5} of the losing pool) for saving stakers' capital - If a reviewer repeatedly raises objections that are overruled by validators, their reputation tier decreases

This creates a market for honest, rigorous criticism — the rarest and most valuable commodity in modern academia.

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9. Staking Architecture

7.1 PhiStaking

Three Fibonacci lock tiers with φ-geometric multipliers:

TIER	LOCK	MULTIPLIER
0	F(5) = 5 days	φ^0 = 1.000x
1	F(8) = 21 days	φ^1 = 1.618x
2	F(10) = 55 days	φ^2 = 2.618x

Base APY: φ^{−(epoch+1)}, starting at 61.8% and decaying by 1/φ each epoch.

Emergency withdrawal penalty: $1/\varphi^2 \approx 38.2\%$ (burned).

7.2 MatryoshkaStaking

Five nested layers — depositing into layer N enrolls in all layers 0 through N:

LAYER	LOCK	MULTIPLIER
0 (Outer Shell)	F(5) = 5 days	1.0x
1 (Middle)	F(8) = 21 days	1.6x
2 (Inner Core)	F(10) = 55 days	3.4x
3 (Golden Heart)	F(12) = 144 days	5.5x
4 (Phi Singularity)	F(14) = 377 days	11.1x

7.3 GoldenMirror

Deposit ARTS → receive φ × amount in gARTS (liquid synthetic). Resolves the lock-vs-liquidity contradiction: earn staking yield while maintaining liquid exposure.

7.4 Proof-of-Patience

Passive temporal mass accrues while tokens remain at the same address:

```
mass(addr) = 1 + √(days_held) / 3
```

Capped at 377 days (F(14)), maximum mass ≈ 7.5x. Amplifies staking rewards and governance voting power.

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10. Governance

8.1 PhiGovernor

Built on OpenZeppelin Governor with physics-derived parameters:

- 30.9% = $\sin^2\theta_{12}$ (neutrino mixing angle)
- F(13) = 233 blocks
- TimelockController with configurable delay
- token_balance × φ^{tier} × temporal_mass

8.2 Staking-Weighted Voting

A voter staked in Tier 2 (55-day lock) with 200 days of temporal mass wields:

```
power = balance × φ² × (1 + √200/3) = balance × 2.618 × 5.71 = balance × 14.95x
```

compared to 1.0x for an unstaked, new holder. This ensures governance is led by committed participants.

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11. DeFi Primitives

9.1 PhiAMM

Weighted constant-product AMM:

```
reserveARTS^{φ/(φ+1)} × reservePaired^{1/(φ+1)} = k
```

Weight 61.8% ARTS / 38.2% paired token. Buying ARTS has reduced slippage; selling has amplified impact — "buy-friendly, sell-resistant" by mathematics.

9.2 NashFee

Dynamic fee converging to Nash equilibrium at 0.618% through a three-player game: - Holders prefer higher fees (more deflation) - Traders prefer lower fees (more volume) - LPs prefer stable fees (predictable yield)

Bounded: [0.236%, 1.0%]. Adjustment: max 0.01% per hour.

12. Smart Contract Architecture

10.1 Deployed Contracts (Base Mainnet, Chain 8453)

#	CONTRACT	ADDRESS	PATTERN
1	PhiCoin (proxy)	`0x1C11133D...Ed0bf`	UUPS
2	PhiStaking (proxy)	`0x37ab9c36...cd6a4`	UUPS
3	PhiGovernor	`0xae286dca...42680`	Non-upgradeable

#	CONTRACT	ADDRESS	PATTERN
4	TimelockController	`0x9ab3a97a...30bfe`	Non-upgradeable
5	PhiVesting	`0xc728062a...38bf`	Non-upgradeable
6	MatryoshkaStaking	`0x25dda634...bc22`	Non-upgradeable
7	GoldenMirror	`0xdb212d65...b9ca`	Non-upgradeable
8	PhiAMM	`0xf32c9784...e575`	Non-upgradeable
9	NashFee	`0xb11e8116...3e52`	Non-upgradeable
10	ZeckendorfTreasury	`0x250161bF...3b55`	Non-upgradeable
11	ArtosphereQuests	`0x51816178...1770`	Non-upgradeable
12	PhiCertificate	`0xb56ce7f1...f94`	Non-upgradeable
13	ArtosphereDiscovery	`0xA345C41e...1D49`	Non-upgradeable
14	DiscoveryOracle	`0xd0f23765...cBE0`	Non-upgradeable
15	DiscoveryStaking (proxy)	`0x3Fc4d346...19e2`	UUPS
16	ResearcherRegistry	`0x29541073...1cc9`	Non-upgradeable
17	FibonacciFusion	`0x53795615...B858`	Non-upgradeable
18		`0x1D4E49E6...7b00`	Non-upgradeable
19		`0x02709268...2D927`	Non-upgradeable
20		`0x1066f1ba...9e1b09`	Non-upgradeable (Chainlink VRF)

Plus PhiMath (library) and ArtosphereConstants (library).

Deploy wallet: `0xED7E49Cd347aAeF4879AF0c42C3B74780299a6A6`

10.2 Dependencies

- Solidity 0.8.24 with optimizer (200 runs, via_ir, EVM Cancun)
- OpenZeppelin Contracts 5.6.1 + Upgradeable 5.6.1
- Foundry (forge-std 1.15)

10.3 Test Coverage

- 306 tests across 18 test files (303 pass, 3 timing-dependent) (302 pass, 4 timing-dependent)
- 107 tests (phi-Hash-256, Proof-of-φ, A5-Crypto v2)
- 70/70 including Higgs-Flavor Identity on-chain verification
- All contracts verified on Basescan

12.2 Cryptographic Foundation

11.1 φ-Hash-256

256-bit hash function with golden ratio round constants and Fibonacci bit rotations (1, 1, 2, 3, 5, 8, 13, 21). 24 rounds. SHA-256 compatible padding. 25/25 tests pass.

11.2 Proof-of-φ (Zeckendorf Consensus)

Mining difficulty measured by maximum Fibonacci index in the hash's Zeckendorf decomposition — replacing Bitcoin's leading-zeros metric with a Fibonacci-index metric.

11.3 A5-Crypto v2

AEAD cipher: AES-256-GCM core with A_5 icosahedral pre-mixing layer (256-element S-box from the 60 rotational symmetries). 37 tests, 12/14 audit findings fixed.

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13. Risk Factors

Participants should consider the following risks:

1. Despite 306 tests, no external audit has been completed. Undiscovered vulnerabilities could lead to loss of funds. Three contracts use upgradeable proxies controlled by a single EOA.

2. ARTS may be classified as a security in certain jurisdictions. Discovery Staking may be characterized as gambling. The regulatory landscape for DeSci tokens is evolving and uncertain.

3. The Artosphere Hypothesis has not been peer-reviewed in academic journals. Approximately 45% of results are empirical pattern-matching, not rigorous derivation. Predictions may be falsified by future experiments (JUNO, HL-LHC, DESI).

4. The project has a single founder (F.B. Sapronov) with no team, advisory board, or institutional affiliation. Continuity depends on one individual.

5. DiscoveryOracle validators are admin-appointed. Resolution of scientific predictions depends on honest validator behavior and correct interpretation of experimental results.

6. ARTS is not currently traded on any exchange. There is no guaranteed liquidity. The LBP has not yet been conducted.

7. FibonacciFusion outcomes are determined by blockhash, which the Base L2 sequencer can predict. Until Chainlink VRF is integrated, fusion outcomes are theoretically manipulable.

The Black Swan Protocol (Self-Termination)

Unlike traditional projects that cling to failed narratives, Artosphere contains a built-in . If one or more Kill Conditions are triggered by experimental data, the protocol acknowledges falsification transparently:

#	CONDITION	EXPERIMENT	WOULD INVALIDATE
1	$\sin^2\theta_{12}$ deviates > 3σ from 1/(2φ)	JUNO	Core V_Art geometry
2	No χ-boson signal at 50-70 GeV by 2032	HL-LHC + DARWIN	Dark matter sector
3	δ_CP deviates > 1.96σ from arctan(√5)	DUNE	CP violation sector
4	w_o deviates > 3σ from $-1+1/\varphi^8$	DESI 5yr	Dark energy sector
5	Axion discovered (θ_QCD ≠ 0)	ADMX/CASPEr	Strong CP sector
6	M_H precision deviates > 5σ from 125.251 GeV	FCC-ee	Higgs-Flavor Identity

- Sector-specific: The individual prediction's Discovery Staking pool is resolved as REFUTED. φ-Cascade distributes the losing pool. The affected Discovery NFT status updates to REFUTED. - Total falsification (3+ sectors invalidated): Treasury activates — remaining treasury distributed pro-rata to ARTS holders, preventing "slow death" of a zombified token.

This is — the most honest mechanism in Web3. We don't just promise our science is right; we define exactly what "wrong" looks like and prepay for it.

14. Roadmap

Completed (April 2026)

- [x] 15 papers on CERN Zenodo (DOIs sealed)
- [x] 20 contracts on Base mainnet (verified)
- [x] DApp on Vercel (5 pages + /discoveries)
- [x] Twitter/Telegram bots (systemd on vps-fi3)
- [x] Discord server (25 channels, 6 categories)
- [x] 15 soulbound Discovery NFTs
- [x] Higgs-Flavor Identity (M_H to 0.0007%)
- [x] GitHub repos public (MIT license)

Q2 2026: Credibility

- [ ] arXiv submission (hep-ph, pending endorsement)
- [ ] Slither/Mythril internal audit
- [ ] Code4rena competitive audit ($5-8K)
- [ ] CoinGecko / CoinMarketCap listing
- [ ] Base Ecosystem Fund grant application
- [ ] Hacker News launch post

Q3 2026: Growth

- [ ] Fjord Foundry LBP (liquidity bootstrapping)
- [ ] Aerodrome DEX integration
- [ ] The Graph subgraph for event indexing
- [ ] Podcast tour (Lex Fridman, Sean Carroll, Bankless)
- [ ] KOL campaign (100 × 1,618 ARTS)
- [ ] Journal deployment to Base mainnet

Q4 2026: Expansion

- [ ] Cross-chain deployment (Arbitrum, Optimism)
- [ ] University partnerships (CERN, MIT, Stanford)
- [ ] Open Discovery submission (community proposes predictions)
- [ ] PRL / Physics Letters B journal submission

2027: First Resolution Events

- [ ] — first major Resolution Event. If $1/(2\varphi) = 0.30902$ is confirmed within 1σ, the first Discovery Staking pool resolves. Conviction NFT holders receive payout.
- [ ] Planck/LiteBIRD cosmological fit for spectral index n_s
- [ ] Conviction NFT secondary market launch
- [ ] L1 testnet with Proof-of-φ consensus

2028-2029: The Experimental Window

- [ ] — tests $w_0 = -1 + 1/\varphi^8 \approx -0.977$. Second Resolution Event.
- [ ] — tests $\arctan(\sqrt{5}) = 65.91°$. If confirmed, CP sector validated.
- [ ] Euclid neutrino mass sensitivity — tests $\Sigma m_\nu = 73.8$ meV
- [ ] Cross-chain deployment (Arbitrum, Optimism)

2030: The Discovery Window

- [ ] at 58 GeV — the biggest test. If found, the Artosphere Hypothesis is elevated from framework to discovery.
- [ ] DARWIN/XLZD direct detection — tests $\sigma_{SI} \sim 5\times10^{-47}$ cm²
- [ ] FCC-ee approval → M_H precision to 10 MeV (tests 125.251 GeV)
- [ ] Open Discovery submissions — community proposes and stakes on new predictions beyond the Artosphere Hypothesis

15. Security

13.1 Audit Status

No external audit has been completed. Internal static analysis (Slither, Mythril) is scheduled for Q2 2026. A competitive audit via Code4rena ($5-8K) is planned before any public liquidity event. No code should be considered production-safe until audits are complete.

13.2 Upgrade Authority

Three contracts (PhiCoin, PhiStaking, DiscoveryStaking) use UUPS proxy upgrades. The `UPGRADER_ROLE` is currently held by a single deploy EOA (`0xED7E...a6A6`). transfer `UPGRADER_ROLE` and `DEFAULT_ADMIN_ROLE` to a Gnosis Safe multisig (3-of-5) behind the existing TimelockController before any public liquidity event.

13.3 Admin Privileges

The deploy wallet holds `DEFAULT_ADMIN_ROLE` across all contracts. Until multisig migration, this constitutes a single point of failure and a centralization risk.

13.4 Entropy

FibonacciFusion uses `blockhash + address + nonce` for randomness. On Base L2, the sequencer can predict blockhash values. integrate Chainlink VRF for tamper-resistant randomness before mainnet volume grows.

13.5 Oracle Security

DiscoveryOracle uses role-based access control with validator voting, a 21-day challenge period, and `VETO_ROLE`. Validators are currently admin-appointed, not elected. Oracle manipulation risk is mitigated by the cooldown and veto mechanism but governance remains centralized until validator election is implemented.

13.6 Known Issues & Remediation

ISSUE	SEVERITY	REMEDIATION	TIMELINE
Single-EOA admin keys	High	Gnosis Safe 3-of-5 multisig	Pre-LBP
No pause/circuit breaker	Medium	Add Pausable to staking contracts	Q2 2026
Predictable on-chain entropy	Medium	Chainlink VRF integration	Q2 2026
No external audit	High	Code4rena competitive audit	Q2 2026
No bug bounty	Medium	Immunefi program launch	With audit
No insurance fund	Low	Treasury-funded reserve	Q3 2026

16. Competitive Landscape

Artosphere sits at a unique intersection: physics-derived tokenomics, on-chain scientific publishing, and a prediction market for experimental validation. No existing project combines all three.

(VitaDAO, Molecule, ResearchHub) fund research or incentivize open science but lack any connection to fundamental physics. Their tokenomics are conventional (governance-vote allocation, curation markets). OriginTrail provides knowledge graphs but has no scientific journal or prediction resolution mechanism.

(Polymarket, Augur) handle binary outcomes for general events. Neither supports structured scientific predictions with oracle-resolved experimental data, Fibonacci-locked stake tiers, or physicist royalty flows.

(Pellis, Evanoff) publish golden-ratio-adjacent physics but have no token, no smart contracts, and no on-chain journal. Pellis derives gauge symmetries from fractal Laplacians but provides no explicit mass formulas or testable predictions at JUNO precision. Evanoff's PQIS derives the W-boson mass from pentagonal symmetry but covers a single parameter versus Artosphere's 35.

FEATURE	VITADAO	RESEARCHHUB	MOLECULE	POLYMARKET	AUGUR	PELLIS
Physics-derived tokenomics	--	--	--	--	--	--
On-chain journal + DOI NFTs	--	--	IP-NFTs	--	--	--
Scientific prediction market	--	--	--	General	General	--
Peer review quorum	--	Token-weighted	--	--	--	--
Parameters derived (0 free)	--	--	--	--	--	Gauge couplings
Testable predictions	--	--	--	--	--	None explicit
Smart contracts deployed	--	Yes	Yes	Yes (off-chain)	Yes	None

FEATURE	VITADAO	RESEARCHHUB	MOLECULE	POLYMARKET	AUGUR	PELLIS
Scientist royalties	--	--	IP royalties	--	--	--

the only project where token supply (F(16) = 987M), governance quorum (sin^2 theta_12), burn rate (1/phi^8), and fee structure (alpha_s/10) each trace to a verified physical constant -- and where users can stake on whether those constants will be confirmed by JUNO, HL-LHC, and DESI experiments within 2027-2030.

17. Legal & Regulatory

ARTS is designed as a utility token providing access to governance, staking, Discovery Staking prediction markets, and on-chain journal participation. ARTS does not represent equity, profit-sharing rights, or ownership interest in any entity. Regulatory classification may vary by jurisdiction; participants should consult local counsel.

This whitepaper is for informational purposes only. Nothing herein constitutes an offer to sell, a solicitation to buy, or investment advice regarding any securities in any jurisdiction. No regulatory authority has reviewed or approved this document.

The protocol operates as permissionless smart contracts on Base L2. No KYC/AML procedures are currently performed. Participants are solely responsible for compliance with applicable laws in their jurisdictions.

On-chain transactions are public and immutable. No personal data is collected off-chain. Users interacting via ORCID-linked profiles do so voluntarily.

All smart contracts are released under the MIT license. The Artosphere Hypothesis scientific content remains copyright F.B. Sapronov.

Roadmap items, predictions, and projected timelines involve substantial uncertainty. No outcome is guaranteed.

Token acquisition, staking rewards, and trading may create taxable events. Consult a qualified tax advisor.

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18. References

Artosphere Papers (CERN Zenodo)

1. Paper I: "Golden Ratio Derivation of Standard Model Constants" — DOI: 10.5281/zenodo.19371476
2. Paper II: "Sub-ppb Fine Structure Constant and Artosphere Potential" — DOI: 10.5281/zenodo.19464050
3. Paper III: "Structural Derivations from V_Art" — DOI: 10.5281/zenodo.19463880
4. Paper IV: "Gravity Hierarchy and Dark Energy" — DOI: 10.5281/zenodo.19469222
5. Paper V: "Complete Derivation Program (28 Parameters)" — DOI: 10.5281/zenodo.19469909
6. Paper VI-b: "M_Z from Planck Scale and Golden Ratio" — DOI: 10.5281/zenodo.19480597
7. Paper VII: "The Higgs-Flavor Identity" — DOI: 10.5281/zenodo.19480973
8. JUNO Letter: "Geometric Origin of Solar Neutrino Mixing Angle" — DOI: 10.5281/zenodo.19472827
9. Phase 2: "V_Art from Cl(6) Fibonacci Fusion" — DOI: 10.5281/zenodo.19473026
10. Phase 4: "M_Z Spectral Invariant" — DOI: 10.5281/zenodo.19473552
11. Collection: "The Artosphere (Complete)" — DOI: 10.5281/zenodo.19471249

External

1. Zeckendorf, E. (1972). "Representation des nombres naturels par une somme de nombres de Fibonacci." Bull. Soc. Roy. Sci. Liège, 41, 179-182.
2. Furey, C. (2016). "Standard Model Physics from an Algebra?" PhD thesis, University of Waterloo.
3. Gresnigt, N. (2018). "Braids, Normed Division Algebras, and Standard Model Symmetries." Phys. Lett. B, 783, 212-221.
4. Connes, A. (1994). Noncommutative Geometry. Academic Press.

Technical

1. OpenZeppelin Contracts v5.6.1 — https://github.com/OpenZeppelin/openzeppelin-contracts
2. Base L2 Documentation — https://docs.base.org
3. Foundry Book — https://book.getfoundry.sh

Verification

Every claim in this whitepaper is verifiable:

```
# Clone and test contracts
git clone https://github.com/fbsmna-coder/artosphere-contracts
cd artosphere-contracts && forge test --summary

# Verify physics formulas
pip install mpmath
python papers/verify_paper3.py  # 22/22 PASS

# Check on-chain
# ARTS Token: https://basescan.org/token/0x1C11133D4dDa9D85a6696B020b0c48e2c24Ed0bf
# All contracts verified on Basescan
```

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