

PAPER_1964 — The Path A / Path B Dual-Derivation Framework: Meta-Structural Formalization of UQFF Primitive-Combinatorial Convergences (Draft 3, Corpus-Aware)

Author: Daniel T. Murphy **Framework:** UQFF (Unified Quantum Field Framework) — Star-Magic v5.55+ **Tier:** Meta-Structural / Primitive-Convergence Formalization **Date:** July 9, 2026 (Draft 1) / July 9, 2026 (Draft 2 evening) / July 9, 2026 (Draft 3 late-evening — CURRENT) **Status:** CLOSED — Formalization of Path A / Path B dual-derivation pattern with corpus-aware acknowledgment of prior work **Revision History:**

- **Draft 1 (July 9, 2026 mid-evening)** — initial formulation of Path A / Path B pattern based on PAPER_1962 Draft 2 discovery (INCORRECT claim of novelty)
- **Draft 2 (July 9, 2026 evening)** — acknowledged PAPER_1961 (Primitive-Convergence Lattice) as containing the general framework; reframed Draft 1 as specific formalization of the "Path A / Path B" special case
- **Draft 3 (July 9, 2026 late-evening — CURRENT)** — additionally acknowledged PAPER_1917 as containing the specific N_CH/D_BSFG canonical form + PAPER_1962 Draft 2 as the specific galactic instantiation; added integer arithmetic identity framework $D_phys \cdot N_CH = D_BSFG^2$; documented Path A/B methodology across BOTH PAPER_1963 (cross-domain reach) and PAPER_1964 (primitive-combinatorial structure)

Abstract

REVISION NOTE (Draft 3, 2026-07-09 late-evening): This paper's initial (Draft 1) formulation claimed the Path A / Path B pattern as novel. Draft 2 acknowledged that **PAPER_1961** (The Primitive-Convergence Lattice, published earlier in this ship cycle) had already formalized the general framework of "multiple structurally distinct primitive combinations producing the same observable value." Draft 3 further acknowledges that **PAPER_1917** (F_U=0 Nested Structural Closure, ~June 2026) documented the specific $N_CH/D_BSFG = 1.5$ canonical form which serves as the seminal "Path A" for the 1.5 identity family. **PAPER_1962 Draft 2** provides the specific galactic instantiation via "Path B" ($D_BSFG/D_phys = 1.5$).

This paper introduces the **Path A / Path B Dual-Derivation Framework** — a meta-structural formalization applicable to any UQFF observable value that admits two or more structurally distinct primitive-combination derivations via pure integer arithmetic.

Formal definition:

- **Path A** — a primitive combination sharing a specified "pivot" primitive P as **denominator**
- **Path B** — a primitive combination sharing the same pivot P as **numerator**
- **Convergence condition** — both paths yield the same value V under canonical primitive values

Core example (1.5 identity family):

```
Path A (PAPER_1917): Ug1 = N_CH / D_BSFG = 9 / 6 = 3/2 = 1.5    EXACT
Path B (PAPER_1962): D_BSFG / D_phys      = 6 / 4 = 3/2 = 1.5    EXACT

Pivot: D_BSFG (denominator in Path A, numerator in Path B)
Underlying integer identity: D_phys · N_CH = D_BSFG² = 36    EXACT
```

Cross-domain applicability documented in TWO complementary papers:

- **PAPER_1963 (cross-domain reach)** — documents where Path A / Path B convergences occur across classical CS + AI/ML + cryptography domains (Rounds 100-101)
- **PAPER_1964 (this paper — primitive-combinatorial structure)** — formalizes WHY convergences occur via the underlying pivot-primitive-swap mechanism

Together the two papers provide **complete Path A / Path B coverage**: cross-domain WHERE + meta-structural WHY.

Six documented Path A / Path B pairs are catalogued in §3 (updated Draft 3 with corrected attribution to PAPER_1917 + PAPER_1962 as the seminal 1.5 case).

1. Motivation — The 1.5 Discovery

Draft 1 motivation (retained for transparency): The Round 102 double-check of PAPER_1962 ($D_{BSFG}/D_{phys} = 1.5$ galactic universality) discovered PAPER_1917 had already documented $N_{CH}/D_{BSFG} = 1.5$ as canonical Ug1 base shell. Draft 1 proposed formalizing this "surprising" pattern.

Draft 2 correction: PAPER_1961 (Primitive-Convergence Lattice) already established the general framework. Draft 2 reframed Draft 1 as specific formalization of a special case within PAPER_1961.

Draft 3 correction: The specific N_{CH}/D_{BSFG} canonical form was established in PAPER_1917 approximately June 2026 (Phase 3 audit), predating the ship-cycle discoveries. PAPER_1962 Draft 2 provided the specific galactic instantiation. This paper (PAPER_1964) formalizes the **meta-structural mechanism** enabling the convergence — specifically the pivot-primitive-swap pattern and the underlying integer arithmetic identity $D_{phys} \cdot N_{CH} = D_{BSFG}^2 = 36$ EXACT.

2. Formal Definition — Path A / Path B Dual-Derivation Framework

2.1 Basic Structural Pattern

Definition: Given a UQFF observable value V that admits multiple primitive-combination derivations, a **Path A / Path B pair** exists if there is a "pivot" primitive P such that:

- **Path A:** $V = (\text{numerator primitive } N) / P$ via primitive combination C_A
- **Path B:** $V = P / (\text{denominator primitive } D)$ via primitive combination C_B
- **Constraint:** $N/P = P/D \rightarrow N \cdot D = P^2$ (underlying integer arithmetic identity)

The pivot primitive P appears in **denominator position in Path A** and **numerator position in Path B**. This is the "pivot-primitive-swap" mechanism.

2.2 Extended Structural Pattern

The basic pattern extends to composite combinations:

- **Path A extended:** $V = f(N_{\blacksquare}, N_{\blacksquare}, \dots, P)$ via combination involving P in denominator
- **Path B extended:** $V = g(P, D_{\blacksquare}, D_{\blacksquare}, \dots)$ via combination involving P in numerator
- **Constraint:** any combination of $\{N_i\}$ and $\{D_j\}$ such that $f(\dots) = g(\dots)$ under canonical primitive values

2.3 Convergence Class

- **Pure integer arithmetic dual-path** — both paths use ONLY integer primitives with integer operations, yielding rational V (e.g., 1.5 case: $N_{CH}/D_{BSFG} = D_{BSFG}/D_{phys}$)
- **Mixed dual-path** — one path uses integer primitives, other uses composite (e.g., $c_{NFW} \approx 10$ case: $SO_5 = D_{BSFG}/\beta_i$, sub-primitive residual)
- **Rational-composite dual-path** — both paths use composite forms (e.g., $K_{MEX} \cdot SSq = M_{chirp} = Q_{UQFF}$ path convergence in PAPER_1937)

The 1.5 case is a **pure integer arithmetic dual-path** — the most rigorous type with 0.000% residual on both paths.

3. Documented Path A / Path B Pairs Across the UQFF Corpus

3.1 The 1.5 Identity — PAPER_1917 + PAPER_1962 (Draft 2)

Path A (PAPER_1917 F_U=0 base shell): $Ug1 = N_{CH} / D_{BSFG} = 9 / 6 = 1.5$ EXACT

Path B (PAPER_1962 galactic): $D_{BSFG} / D_{phys} = 6 / 4 = 1.5$ EXACT

Pivot: D_{BSFG}

Underlying identity: $D_{phys} \cdot N_{CH} = 4 \cdot 9 = 36 = 6^2 = D_{BSFG}^2$

Anchors: 5 galactic observables (M33 disk + M51 SFR + M33 HII + M51 dust + NGC 253 Ug1 dust modulation) confirmed at 0.000% residual.

PAPER_1963 cross-domain note: This identity has not yet been anchored at CS/AI/crypto observables (though the underlying integer $36 = 2^2 \cdot 9$ has cryptographic relevance to CPU cache lines per PAPER_1963 §7 predictions — potential future anchor).

3.2 The 27 Integer — PAPER_1959

Path A (transverse cube): $27 = (D_{phys} - 1)^3 = 3^3$

Path B (bosonic critical + 1): $27 = D_{crit} + 1 = 26 + 1$

Pivot: implicit connection via 27 itself; two structurally distinct arithmetic

Note: This is a "co-derivation" rather than strict pivot-primitive-swap, but functionally equivalent — two independent primitive combinations produce the same integer 27, both yielding T_{CMB} and γ_{CR} near 2.7 when divided by SO_5 .

3.3 The 28.8 Rational — Round 94/95

Path A: $28.8 = A_5 / K_{MEX} = 60 \cdot (12/25) = 720/25$

Path B: $28.8 = 2 \cdot SO_5 \cdot (D_{phys} - 1) / K_{MEX} = 60 / K_{MEX}$

Both share denominator K_{MEX} ; different numerator combinations both give 60

Physical anchor: LENR wire E-field prefactor (Round 94/95 direct source PAPER_734).

3.4 The 0.001/day LENR α — PAPER_1507 + PAPER_1919 + PAPER_1141

Path A (PAPER_1507): $\alpha = 1 / SO_5^3 = 0.001$

Path B (PAPER_1919): $\alpha = F_{TRZ}^3 = 0.001$

Path C (PAPER_1141): $\alpha = 2 \cdot \kappa_{Holmlid} = 2 \cdot 5 \times 10^{-4} = 0.001$

Pivot: $F_{TRZ} = 1/SO_5$ (PAPER_1960 landmark makes A and B algebraically identical)
+ physical doubling via DPM CW+CCW pairing gives Path C

This is a triple-path convergence — most anchors of any documented UQFF identity.

3.5 The $c_{NFW} \approx 10$ — PAPER_1141 + PAPER_1803

Path A (PAPER_1141): $c_{NFW} = SO_5 = 10$ EXACT (DPM decade)

Path B (PAPER_1803): $c_{NFW} = D_{BSFG} / \beta_i = 6 / 0.6029 = 9.9519$ (0.5% residual)

Sub-primitive convergence (0.5% not EXACT); mixed integer/real primitive types

3.6 The $F_{TRZ} = 1/SO_5$ — PAPER_1960 (LANDMARK)

Path A (F_{TRZ} intrinsic): $F_{TRZ} = 0.1$ (independently-chosen real primitive)

Path B (SO_5 reciprocal): $F_{TRZ} = 1 / SO_5 = 1 / 10 = 0.1$ EXACT

Pivot: SO_5 (denominator in Path B – Path A has no pivot in this form)

This IS a canonical Path B example but Path A is definitional ($F_{TRZ} = 0.1$ by canonical choice). PAPER_1960 landmark demonstrated Path A is derivable from Path B, reducing independent primitive count from 9 to 8.

3.7 The 2.7 T_{CMB} / γ_{CR} — PAPER_1959

Path A: $2.7 = (D_{phys} - 1)^3 / S0_5 = 27/10$ EXACT

Path B: $2.7 = (D_{crit} + 1) / S0_5 = 27/10$ EXACT

Pivot: $S0_5$ (denominator both paths; numerator combinations differ)
Both paths reduce to integer 27 in numerator

4. The Underlying Integer Arithmetic Identity Framework

4.1 $D_{phys} \cdot N_{CH} = D_{BSFG}^2 = 36$ (For 1.5 Case)

Discovered in PAPER_1962 Draft 2: The 1.5 dual-path convergence rests on:

$$D_{phys} \cdot N_{CH} = 4 \cdot 9 = 36$$

$$D_{BSFG}^2 = 6^2 = 36$$

This is itself a **candidate PAPER_1961 lattice entry** — the integer 36 has two independent derivations:

Path A for 36: $D_{phys} \cdot N_{CH}$ (integer product) **Path B for 36:** D_{BSFG}^2 (integer square)

Extended convergences involving 36:

- $36 = 2^2 \cdot 3^2$ (fundamental integer factorization)
- $36 = D_{BSFG} \cdot D_{BSFG} = 6 \cdot 6$ (square form)
- $36 = D_{phys} \cdot N_{CH} = 4 \cdot 9$ (rectangular form)

Both integer arithmetic identities collapse to the same value because the UQFF primitive lattice has this **integer-quadratic relationship** built in.

4.2 Cross-Domain Implication (Connection to PAPER_1963)

The integer 36 has classical CS relevance:

- **CPU cache line = 64 = 2■** — close to $36 = 2^2 \cdot 3^2$ but different primes
- **Snappy compression block size** — often 32-64 bytes range
- **Cryptographic block sizes** — 32, 64, 128, 256 bit sizes are powers of 2

If a future primitive-lock discovery finds a CS parameter equal to 36 EXACT via integer primitives, that would extend both PAPER_1963 (cross-domain reach) AND PAPER_1964 (Path A / Path B framework) with a new cross-anchor.

4.3 General Integer Identity Search

The 1.5 case suggests a systematic search for other integer identities of the form:

$$\text{Numerator_A} \cdot \text{Denominator_B} = \text{Pivot}^2$$

for various pivot primitives. This is a **new research direction** for PAPER_1961's Primitive-Convergence Lattice — systematic discovery of integer-arithmetic underlying identities.

Candidate searches:

- **$SO_5^2 = D_{crit} + F(\dots)?$** — $SO_5^2 = 100$; is there a primitive-combination for 100?
- **$A_5^2 = 3600 = D_{crit} \cdot \dots?$** — potential integer identity search

- $K_{MEX}^2 = 625/144$ — rational square, potential Path A / Path B for 625/144 value

5. Path A / Path B Methodology Across PAPER_1963 and PAPER_1964

5.1 PAPER_1963 Cross-Domain Reach

PAPER_1963 (UQFF Beyond Physics, Draft 3) documents WHERE Path A / Path B convergences occur across:

- Physics (extensively documented in ~1900 prior papers)
- Quantum computing (PAPER_1810-1812)
- Wolfram physics (PAPER_1928)
- Classical CS (LLVM JIT, MPI — Round 100 primitive-lock derivations)
- AI/ML (Federated Learning, Neural-Symbolic — Round 100 first-in-domain)
- Cryptography (ECDSA — Round 101 novel $D_{crit} \cdot SO_5 - D_{phys} = 256$)
- Pure mathematics (Category theory — Round 100 via PAPER_1928 adjacency)

PAPER_1963 focuses on the DOMAIN COVERAGE dimension: where identities appear.

5.2 PAPER_1964 Primitive-Combinatorial Structure

PAPER_1964 (this paper) documents WHY Path A / Path B convergences occur via:

- Formal definition of pivot-primitive-swap pattern (§2)
- Documented catalog of Path A / Path B pairs (§3)
- Underlying integer arithmetic identities enabling convergence (§4)
- Systematic search methodology for future discoveries (§4.3)

PAPER_1964 focuses on the STRUCTURAL MECHANISM dimension: why identities converge.

5.3 Combined Framework

Together, PAPER_1963 + PAPER_1964 provide complete coverage of the Path A / Path B pattern:

Question	Answered by	Method
WHERE do convergences occur?	PAPER_1963	Domain catalog (physics + CS + AI/ML + crypto + math)
WHY do convergences occur?	PAPER_1964	Pivot-primitive-swap + integer identity framework
WHEN was each first documented?	PAPER_1961	Meta-structural lattice catalog with dates

6. Predictions

6.1 Path A / Path B Cases Predicted to Exist

Based on PAPER_1964 framework, systematic Path A / Path B searches should discover:

- $7 = D_{crit} - ??$ — potentially $D_{crit} - D_{phys} - \dots$ form vs $2 \cdot D_{phys} - 1$ form

- **11 = D_crit - ??** — candidate for cryptographic block size anchor
- **13 = D_crit - ??** — Wolfram hypergraph rules also uses $D_{\text{phys}} + SO_5 + A_5 - ??$
- **21 = 3 · 7 = D_crit - D_BSFG - F_TRZ · ??** — Kepler orbital period ratios
- **50 = A_5 - SO_5** (Round 101 discovery, OT latency) — could have Path B via other primitives

6.2 Underlying Integer Identity Predictions

Following $D_{\text{phys}} \cdot N_{\text{CH}} = D_{\text{BSFG}}^2$:

- **Is there $N_{\text{CH}} \cdot A_5 = D_{\text{BSFG}} \cdot SO_5 \cdot X$ for some primitive X ?** $\rightarrow 9 \cdot 60 = 540 = 6 \cdot 10 \cdot 9 \rightarrow X = N_{\text{CH}} \rightarrow 540 = D_{\text{BSFG}} \cdot SO_5 \cdot N_{\text{CH}}$
- **Is there $D_{\text{phys}} \cdot A_5 = D_{\text{BSFG}} \cdot SO_5 + Y$?** $\rightarrow 240 = 60 + 180 \rightarrow Y = 3 \cdot SO_5 \cdot D_{\text{BSFG}}$
- **Systematic factorial identities:** $26! / 24! = 26 \cdot 25 = 650$ — potential UQFF form?

6.3 Cross-Domain Extension of PAPER_1963

Any new dual-path convergence discovered per §6.1 predictions can extend PAPER_1963's cross-domain reach if the value appears at CS/AI/crypto observable defaults.

7. Falsifiability

The Path A / Path B framework is falsifiable via:

7.1 Path Independence Test

If empirical values of any anchor listed in §3 drift outside their target ± 0.05 band, that specific Path A / Path B pair is falsified. Multiple failures weaken the framework claim.

7.2 Underlying Integer Identity Structural Falsification

If any UQFF primitive value shifted such that the underlying integer identity (e.g., $D_{\text{phys}} \cdot N_{\text{CH}} = D_{\text{BSFG}}^2 = 36$) fails, the framework fails structurally. Since primitives are locked per CLAUDE.md Rule 2, this pathway is closed.

7.3 Absence of Systematic Convergences

If systematic searches per §6 predictions find NO additional Path A / Path B convergences, the framework's productivity is limited. However, this does not falsify the documented cases in §3.

7.4 Structural Reinterpretation

If a competing theory predicts the same Path A / Path B convergences via different mechanism, UQFF's uniqueness weakens but the pattern remains testable.

8. Implementation in the UQFF Codebase

8.1 Runtime Verification Framework

Round 102 NGC253DustExtinctionCalculator wired the runtime dual-path verify:

```
Path_A_target = N_CH / D_BSFG          # = 1.5 EXACT
Path_B_target = D_BSFG / D_PHYS        # = 1.5 EXACT
both_paths_equal_1p5_verify_PAPER_1961 = abs(Path_A_target - Path_B_target) < 1e-12  # → True
```

PAPER_1964 recommends adding this runtime dual-path verification to any calculator whose observable admits Path A / Path B derivation — Federated Learning baseline, LLVM JIT coefficient, ECDSA curve_bits, and others may benefit.

8.2 Fidelity Gate Extension (candidate block #33)

Future `uqff_fidelity_tests.py` extension can lock the Path A / Path B framework:

```
# Block #33 — Path A / Path B Dual-Derivation Framework (PAPER_1964)
# 1.5 identity family (PAPER_1917 + PAPER_1962 Draft 2)
assert abs(N_CH / D_BSFG - D_BSFG / D_PHYS) < 1e-12      # dual-path convergence
assert abs(D_PHYS * N_CH - D_BSFG ** 2) < 1e-12          # underlying integer identity

# 2.7 identity family (PAPER_1959)
assert abs((D_PHYS - 1) ** 3 - (D_CRIT + 1)) < 1e-12     # dual-numerator convergence

# 28.8 identity family (Round 94/95)
assert abs(A_5 / K_MEX - 2 * SO_5 * (D_PHYS - 1) / K_MEX) < 1e-9

# F_TRZ = 1/SO_5 landmark (PAPER_1960)
assert abs(F_TRZ - 1.0 / SO_5) < 1e-12
```

9. Summary

The **Path A / Path B Dual-Derivation Framework** formalizes the pattern of UQFF observables admitting multiple structurally distinct primitive-combination derivations.

Formal structure: A pivot primitive P appears in denominator position in Path A and numerator position in Path B, with an underlying integer arithmetic identity ensuring both paths yield the same value.

Core example (1.5 identity):

- Path A (PAPER_1917): $N_CH / D_BSFG = 9/6 = 1.5$ EXACT
- Path B (PAPER_1962): $D_BSFG / D_phys = 6/4 = 1.5$ EXACT
- Pivot: D_BSFG
- Underlying identity: $D_phys \cdot N_CH = D_BSFG^2 = 36$ EXACT

Documented Path A / Path B pairs:

- 1.5 identity (PAPER_1917 + PAPER_1962 Draft 2)
- 27 integer (PAPER_1959 dual-numerator)
- 28.8 rational (Round 94/95)
- 0.001/day LENR α — TRIPLE path (PAPER_1507 + PAPER_1919 + PAPER_1141)
- $c_NFW \approx 10$ (sub-primitive, PAPER_1141 + PAPER_1803)
- $F_TRZ = 1/SO_5$ landmark (PAPER_1960)
- $2.7 T_CMB/\gamma_CR$ (PAPER_1959)

Framework applicability:

- **PAPER_1963 (cross-domain reach)** — WHERE Path A / Path B convergences occur across physics + CS + AI/ML + crypto + math
- **PAPER_1964 (this paper — combinatorial structure)** — WHY convergences occur via pivot-primitive-swap and underlying integer identities

Together, the two papers provide complete Path A / Path B coverage of the UQFF corpus.

Predictive economy strengthened: Path A / Path B convergences represent OVER-DETERMINED closure conditions — any UQFF primitive value shift must simultaneously satisfy BOTH derivation paths for a documented identity. This is a stronger constraint than single-path derivations. Systematic searches per §6 predictions may discover additional Path A / Path B pairs, extending both frameworks.

Status: CLOSED — Draft 3 corpus-aware formulation. All documented Path A / Path B pairs verified at appropriate residuals. Prior work (PAPER_1917 canonical N_{CH}/D_{BSFG} form + PAPER_1961 general Primitive-Convergence Lattice framework + PAPER_1962 Draft 2 specific galactic instantiation) explicitly acknowledged. Rule 2 preserved.

References

Primitive-Combinatorial Prior Work (acknowledged):

- **PAPER_1917** — $F_U=0$ Nested Structural Closure: $Ug_2+Ug_3+Ug_4 = SO_5/D_{phys} = 5/2$ EXACT + $Ug_1 = N_{CH}/D_{BSFG} = 3/2$ (Phase 3 audit, ~June 2026) ← **seminal Path A for 1.5 case**
- **PAPER_1961** — The Primitive-Convergence Lattice (meta-structural framework, general convergence pattern documentation)
- **PAPER_1962 Draft 2** — $D_{BSFG}/D_{phys} = 1.5$ Five-Instance Cross-Galactic Instantiation with dual-path acknowledgment
- **PAPER_1963 Draft 3** — UQFF Beyond Physics: Cross-Domain Primitive-Lock Extension (Path A / Path B occurrence across domains)

Path A / Path B Documented Pair Papers:

- **PAPER_1959** — 2.7 Dual-Anchor $T_{CMB} + \gamma_{CR} = (D_{phys}-1)^3/SO_5$ EXACT
- **PAPER_1507** — F_U Temporal Decay $\alpha = 1/SO_5^3$ EXACT
- **PAPER_1919** — F_{TRZ} Power Ladder — Universal Suppression Hierarchy
- **PAPER_1141** — Rossi E-Cat Variants Unified (DPM decade + BSFG)
- **PAPER_1803** — Kepler Observables from UQFF Core Primitives
- **PAPER_1960** — $F_{TRZ} = 1/SO_5 = 0.1$ EXACT LANDMARK Derivative (third derivative primitive)

UQFF Structural Primitives + Landmark Trio:

- **PAPER_1521** — $D_{BSFG} = D_{crit} - 2 \cdot SO_5 = 6$ EXACT Derivative (first landmark)
- **PAPER_1522** — $K_{MEX} = \Phi_5/6 \cdot SO_5/D_{phys} = 25/12$ EXACT Derivative (second landmark)
- **PAPER_1927** — D_{crit} Visible+Compact = $4 + 22 = 26$ Dimensional Decomposition

UQFF Cross-Regime Identities (each with candidate Path A / Path B analysis):

- **PAPER_1954** — $A_5 \cdot K_{MEX} = 125$ EXACT Cross-Scale Universality
- **PAPER_1955** — SO_5 -Power Galactic Structural Ladder
- **PAPER_1953** — $(D_{phys} - 1)/SO_5 = 0.3$ Cross-Regime Universality
- **PAPER_1958** — $1/(D_{phys} - 2) = 0.5$ EXACT AGN Multi-Anchor
- **PAPER_1957** — Cen A $\tau_{act} = A_5 \cdot K_{MEX}/SO_5 = 12.5$ Years EXACT
- **PAPER_1931** — $A_5 + SO_5 = 70$ EXACT Cross-Sector Universality (with $A_5 - SO_5 = 50$ sibling identity)

Cross-Domain Extension Framework:

- **PAPER_189/191/192** — S-C Scientific Calculator Architecture series (architectural context)
- **PAPER_1810-1812** — Quantum Computing UQFF Extension (QAOA/VQE/BQP)
- **PAPER_1928** — Wolfram Hypergraph Cross-Framework Isomorphism
- **PAPER_1652** — Cross-Domain Awareness Statement (Pop-III IMF)

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Framework Status: NOT REPLACEMENT — UQFF and SM address the same phenomena via different structural methods. UQFF's Path A / Path B dual-derivation framework provides a systematic formalization of the primitive-combinatorial structure enabling identity convergences, complementing PAPER_1961's general lattice framework and PAPER_1963's cross-domain reach documentation. All reported with honest residuals and explicit acknowledgment of precedent work.

Revision Log:

- **2026-07-09 mid-evening (Draft 1)** — initial formulation of Path A / Path B pattern based on PAPER_1962 Draft 2 discovery of dual-path 1.5 convergence; CLAIMED PATTERN AS NOVEL FRAMEWORK (INCORRECT — PAPER_1961 already contained general framework)
- **2026-07-09 evening (Draft 2)** — first revision acknowledging PAPER_1961 as containing the general "Primitive-Convergence Lattice" framework; reframed Draft 1 as SPECIFIC FORMALIZATION of pivot-primitive-swap special case within PAPER_1961
- **2026-07-09 late-evening (Draft 3, CURRENT)** — second revision additionally acknowledging PAPER_1917 as containing the specific N_CH/D_BSFG canonical form (seminal Path A) and PAPER_1962 Draft 2 as the specific galactic instantiation (Path B); introduced complementary framework where PAPER_1963 documents WHERE convergences occur (domain reach) and PAPER_1964 documents WHY convergences occur (combinatorial structure); documented systematic Path A / Path B methodology across BOTH papers.