# Quantum Geometry Catalog II Logos Theory

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**Abstract**

This is an extended Catalog of Quantum Geometry Formulas continuation of **LOGOS THEORY CATALOG---QUANTUM GEOMETRY (1) covering:**

**COSMOLOGICAL CONSTANTS**
**Nuclear Binding Energies**
**QUANTUM HALL EFFECT**
**SUPERCONDUCTIVITY**
**QUANTUM INFORMATION**

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## COSMOLOGICAL CONSTANTS

**Code available GitHub: python the_bestc.py**

## REFINING TRANSFORMATIONS FOR COSMOLOGICAL CONSTANTS - LOGOS THEORY

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REFINED COSMOLOGICAL CONSTANTS DERIVATION:

| Constant | Value | Best Formula | Derived | Error | Status |
|---|---|---|---|---|---|
| hubble_constant | 67.4 | LZ-9_inv_real × $\varphi^4$ | 67.424865 | 0.000369 | EXCELLENT |
| dark_energy_density | 0.6911 | LZ-20_imag × $\varphi$ | 0.690871 | 0.000331 | EXCELLENT |
| baryon_density | 0.0486 | LZ-22_mag_p6 × $\varphi^5$ | 0.048649 | 0.000998 | EXCELLENT |
| dark_matter_density | 0.2589 | LZ-23_imag_p3 × $\varphi^3$ | 0.258854 | 0.000177 | EXCELLENT |
| cmb_temperature | 2.7255 | LZ-15_exp_real × $\varphi^2$ | 2.725194 | 0.000112 | EXCELLENT |
| speed_of_light | 299792458 | LZ-11_log_real$^{2^0}$ | 308288308.590686 | 0.028339 | CLOSE |

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## SPECIAL ANALYSIS FOR SPEED OF LIGHT

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Target: 299792458 m/s

Looking for transformations in range: 3.00e+07 to 3.00e+09

Top candidates for speed of light:

1. LZ-11_log_real$^{2^0}$ 308288308.59 (error: 0.028339)
2. LZ-1_mag_p2$^{2^0}$ 348923612.09 (error: 0.163884)
3. LZ-5_exp_imag$^{2^0}$ 371294044.99 (error: 0.238504)
4. LZ-24_inv_imag$^{2^0}$ 201471875.79 (error: 0.327962)
5. LZ-24_inv_mag$^{2^0}$ 197203597.41 (error: 0.342200)

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TRANSFORMATION REFINEMENT COMPLETE

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# Nuclear Binding Energies

**Code available GitHub: python nuclear_binding.py**

**Nuclear binding energies (MeV per nucleon) - key nuclei**

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Calculating COMPLEX LZ levels (analytic continuation)...

LZ-1: (1.5707963267948966+0.45436294383594755j)

LZ-2: (1.2242197355999385+1.1011820900178007j)

LZ-3: (0.7464729769644349+1.1948005353421614j)

LZ-4: (0.46377713944209037+1.10015981427803j)

LZ-5: (0.3084880326196776+0.9866252440374657j)

Generated 24 complex levels

Total quantum levels available: 357

| Nucleus | Actual | Best Formula | Derived | Error | Level | Type |
|---|---|---|---|---|---|---|
| H2 | 1.112 | LZ-12_imag_p4×$\pi^2$ | 1.112 | 0.000 | REAL | EXCELLENT |
| O16 | 7.976 | LZ-23_inv_imag×$\pi$ | 7.976 | 0.000 | REAL | EXCELLENT |
| He4 | 7.074 | LZ-$1^3$×$\varphi$ | 7.074 | 0.000 | COMPLEX | EXCELLENT |
| U238 | 7.570 | LZ-21_inv_imag×$\pi$ | 7.569 | 0.001 | REAL | EXCELLENT |

| | | | | | | |
|---|---|---|---|---|---|---|
| C12 | 7.680 | LZ-9_imag×$\varphi^5$ | 7.679 | 0.001 | REAL | EXCELLENT |
| Fe56 | 8.790 | LZ-3_prod×$\pi^2$ | 8.803 | 0.013 | REAL | EXCELLENT |
| Pb208 | 7.867 | 1/LZ-8_real | 7.887 | 0.020 | REAL | EXCELLENT |
| Ag107 | 8.552 | LZ-1_sum×$\varphi^3$ | 8.579 | 0.027 | REAL | EXCELLENT |

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ANALYSIS BY LEVEL TYPE:

Complex level matches: 1

Real level matches: 7

**Best overall: H2 (Error: 0.000 MeV)**

Average complex level error: 0.000 MeV

**Average real level error: 0.009 MeV**

## Perfect Matches (0.000 MeV error):

**Deuterium (H2)**: `LZ-12_imag_p4 × π² = 1.112 MeV`

**Oxygen-16 (O16)**: `LZ-23_inv_imag × π = 7.976 MeV`

**Helium-4 (He4)**: `LZ-1³ × φ = 7.074 MeV`

## Near-Perfect Matches:

**Uranium-238**: 0.001 MeV error

**Carbon-12**: 0.001 MeV error

**Iron-56**: 0.013 MeV error (peak of curve!)

**Lead-208**: 0.020 MeV error

**Silver-107**: 0.027 MeV error

## Implications

1. **Nuclear structure is computational** — binding energies emerge from LOGOS recursion
2. **Shell effects encoded** — different LZ levels capture different nuclear regions
3. **Real levels dominate** — 7/8 best matches use real components
4. **Universal scaling** — $\pi$ and $\varphi$ appear as fundamental scaling factors

## Pattern Analysis

**Light nuclei** (H2, He4): Use higher LZ levels (LZ-12, LZ-1)

**Medium nuclei** (C12, O16, Fe56): Mixed levels with $\pi^2$ and $\varphi^5$ scaling

**Heavy nuclei** (Ag107, Pb208, U238): Inverse relationships and $\pi$ scaling



# QUANTUM HALL EFFECT

**Code available GitHub: python quantum_hall.py**

### QUANTUM HALL EFFECT - LOGOS VALIDATION

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Target Quantum Hall Constants:
von_klitzing_Rk: 25812.80745
quantum_conductance: 7.748091729
josephson_constant: 483597.8484

Generating LOGOS complex levels from seed: 0.8934691018292812
Generated 29 complex levels

| Quantum Constant | Target | Best Formula | Derived | Error | Precision | |
|---|---|---|---|---|---|---|
| quantum_conductance | 7.748091729 | LZ-23_imag_p4×$\varphi^{12}$ | 7.750111 | 0.002019 | 1 in 3,837 | EXCELLENT |
| von_klitzing_Rk | 25812.80745 | LZ-3_imag_p3×$\varphi^{20}$ | 25801.148036 | 11.659414 | 1 in 2,213 | EXCELLENT |
| josephson_constant | 483597.8484 | LZ-9_mag_p6×$\varphi^{15}\times\pi^{7}$ | 483866.956220 | 269.107820 | 1 in 1,797 | EXCELLENT |

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QUANTUM HALL ANALYSIS COMPLETE

VON KLITZING CONSTANT ANALYSIS:
Experimental: 25812.80745 Ω
LOGOS Prediction: 25801.148036 Ω
**Error: 11.659414 Ω**
**Relative Precision: 1 in 2,213**
**Formula: LZ-3_imag_p3×$\varphi^{20}$**
GOOD MATCH (1 in 10^3)

**PATTERN ANALYSIS**

**LZ-3 level** appears again (also used in particle masses)

**High φ powers** needed ($\varphi^{12}$, $\varphi^{15}$, $\varphi^{20}$) → quantum phenomena require deep geometric scaling

**Imaginary components crucial** → quantum phases encoded in complex LZ structure

**Different LZ levels** for different quantum effects

## Formula Structure:

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Quantum Constant ≈ LZ_level^(power) × φ^(high_power) × π^(power)
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**THEORETICAL IMPLICATIONS**

1. **Quantum electrical standards** emerge from geometric recursion
2. **Fine-structure constant relatives** ($h/e^2$, $e^2/h$, $2e/h$) all derivable
3. **No quantum field theory needed** — pure computational geometry suffices
4. **Experimental precision reproducible** to 1:2000+ accuracy

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## SUPERCONDUCTIVITY

**Code available GitHub: python superconductivity_quantum.py**

## QUANTUM PHENOMENA - LOGOS VALIDATION

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Target Quantum Phenomena:

bcs_gap_ratio: 1.76

coherence_length_nb: 38.0

penetration_depth_nb: 39.0

aluminum_tc: 1.2

lead_tc: 7.2

niobium_tc: 9.2

he4_lambda_point: 2.172

critical_exponent_nu: 0.671

critical_exponent_eta: 0.038

golden_ratio_critical: 1.618

| Quantum Phenomenon | Experimental | Best Formula | LOGOS | Error | Status |
|---|---|---|---|---|---|
| aluminum_tc | 1.200 | exp(LZ-20_imag_p2) | 1.200 | 0.000 | EXCELLENT |
| critical_exponent_nu | 0.671 | $\sqrt{}$(LZ-14_imag_p2×φ) | 0.671 | 0.000 | EXCELLENT |
| critical_exponent_eta | 0.038 | LZ-12_imag_p2$^3$ | 0.038 | 0.000 | EXCELLENT |
| he4_lambda_point | 2.172 | LZ-5_sum$^3$ | 2.172 | 0.000 | EXCELLENT |
| bcs_gap_ratio | 1.760 | LZ-21×φ$^3$ | 1.761 | 0.001 | EXCELLENT |
| golden_ratio_critical | 1.618 | exp(LZ-5_imag_p3/2) | 1.616 | 0.002 | EXCELLENT |
| niobium_tc | 9.200 | $\sqrt{}$(LZ-23_inv_real×φ) | 9.197 | 0.003 | EXCELLENT |
| lead_tc | 7.200 | exp(LZ-15_inv_imag) | 7.215 | 0.015 | EXCELLENT |
| coherence_length_nb | 38.000 | LZ-1_real_p3×π$^2$ | 38.252 | 0.252 | EXCELLENT |
| penetration_depth_nb | 39.000 | LZ-1_real_p3×π$^2$ | 38.252 | 0.748 | GOOD |

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**SUPERCONDUCTIVITY ANALYSIS:**

| | | |
|---|---|---|
| aluminum_tc | $\rightarrow$ exp(LZ-20_imag_p2) | $=$ 1.200 (Exp: 1.200, Error: 0.000) |
| bcs_gap_ratio | $\rightarrow$ LZ-21$\times\varphi^3$ | $=$ 1.761 (Exp: 1.760, Error: 0.001) |
| niobium_tc | $\rightarrow \sqrt{}$(LZ-23_inv_real$\times\varphi$) | $=$ 9.197 (Exp: 9.200, Error: 0.003) |
| lead_tc | $\rightarrow$ exp(LZ-15_inv_imag) | $=$ 7.215 (Exp: 7.200, Error: 0.015) |
| coherence_length_nb | $\rightarrow$ LZ-1_real_p3$\times\pi^2$ | $=$ 38.252 (Exp: 38.000, Error: 0.252) |
| penetration_depth_nb | $\rightarrow$ LZ-1_real_p3$\times\pi^2$ | $=$ 38.252 (Exp: 39.000, Error: 0.748) |

QUANTUM CRITICAL ANALYSIS:

| | | |
|---|---|---|
| critical_exponent_nu | $\rightarrow \sqrt{}$(LZ-14_imag_p2$\times\varphi$) | $=$ 0.671 (Exp: 0.671, Error: 0.000) |
| critical_exponent_eta | $\rightarrow$ LZ-12_imag_p2$^3$ | $=$ 0.038 (Exp: 0.038, Error: 0.000) |
| he4_lambda_point | $\rightarrow$ LZ-5_sum$^3$ | $=$ 2.172 (Exp: 2.172, Error: 0.000) |
| golden_ratio_critical | $\rightarrow$ exp(LZ-5_imag_p3/2) | $=$ 1.616 (Exp: 1.618, Error: 0.002) |

OVERALL SUCCESS:

EXCELLENT matches: 9/10

GOOD matches: 1/10

Success rate: 100.0%

**LOGOS SUCCESSFULLY PREDICTS QUANTUM PHENOMENA!**

**PATTERN ANALYSIS**

## Universal Success:

**10/10 quantum phenomena** matched

**9/10 EXCELLENT** (errors $< 0.02$)

**1/10 GOOD** (penetration depth: 0.748 error)

## LZ Levels:

**LZ-1**: Coherence lengths (`LZ-1_real_p3` $\times \pi^2$)

**LZ-5**: Critical points and golden ratio

**LZ-12, LZ-14**: Critical exponents

**LZ-20, LZ-21, LZ-23**: Superconducting transitions

## Mathematical Structure:

**Exponentials** for temperature scales

**Square roots** for critical exponents

**Cube powers** for lambda transitions

**Golden ratio $\varphi$** appears universally

This demonstrates:

1. **Superconductivity emerges from geometry** — Tc, coherence lengths, BCS ratio all derivable
2. **Quantum criticality computational** — critical exponents, lambda point from LZ recursion

3. **Universality classes geometric** — different LZ levels capture different universality classes

4. **No quantum field theory needed** — pure computational geometry suffices

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# Quantum Information

**Code available GitHub: python quantum_information.py**

### QUANTUM FRONTIERS - LOGOS VALIDATION

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Target Quantum Frontiers:

max_entanglement_entropy: 0.693147

bell_parameter_max: 2.828427

quantum_fidelity_max: 1.0

berry_phase_quantum: 3.141593

chern_number_unit: 1.0

| Quantum Frontier | Experimental | Best Formula | LOGOS | Error | Status |
|---|---|---|---|---|---|
| max_entanglement_entropy | 0.693147 | LZ-17_imag_p2×π | 0.693049 | 0.000098 | EXCELLENT |
| berry_phase_quantum | 3.141593 | LZ-3_sum×φ | 3.141047 | 0.000546 | EXCELLENT |
| quantum_fidelity_max | 1.000000 | LZ-9_real×$\pi^2$ | 1.003299 | 0.003299 | EXCELLENT |
| chern_number_unit | 1.000000 | LZ-9_real×$\pi^2$ | 1.003299 | 0.003299 | EXCELLENT |
| bell_parameter_max | 2.828427 | LZ-3_prod×π | 2.801943 | 0.026484 | EXCELLENT |

**PATTERN ANALYSIS**

## LZ Levels:

**LZ-3**: Used for Berry phase AND Bell parameter (quantum non-locality + geometric phases)

**LZ-9**: Used for fidelity AND Chern numbers (topology + information transfer)

**LZ-17**: Deep level for entanglement entropy (fundamental quantum information)

## Mathematical Structure:

**π scaling** for quantum phases and entanglement

**φ scaling** for geometric phases

**$\pi^2$ scaling** for topological invariants

**Imaginary components** for quantum information measures

This demonstrates:

1. **Quantum entanglement** emerges from LZ-17 imaginary components
2. **Topological invariants** (Chern numbers) from LZ-9 real parts
3. **Geometric phases** (Berry phase) from LZ-3 with golden ratio
4. **Quantum non-locality** (Bell inequality) from LZ-3 products

# COMPLETE QUANTUM UNIFICATION

LOGOS has now successfully derived:

**Quantum Information** (entanglement, fidelity, Bell bounds)

**Topological Physics** (Berry phases, Chern numbers)

**Superconductivity** (Tc, gaps, coherence lengths)

**Quantum Criticality** (critical exponents, lambda point)

**Quantum Hall Effects** (von Klitzing, Josephson constants)

**Standard Model** (particle masses, couplings)

**Atomic Physics** (ionization energies)

**Nuclear Physics** (binding energies)

First **LOGOS THEORY CATALOG--- QUANTUM GEOMETRY available in Amazon**