

# 3D+3D Discrete Spacetime Framework

## Complete Repository Guide — Version 5.0

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## 1. START HERE

If you are reading this repository for the first time, begin with these two consolidated papers:

**Paper A** — Geometric Dark Energy and Baryogenesis from Temporal Compactification in Six-Dimensional Discrete Spacetime (23 pages). Derives  $w_0 = -0.70$  from 6D geometry, unifies dark energy, baryogenesis, and strong CP. File: [Paper\\_A\\_Dark\\_Energy\\_Baryogenesis\\_v1\\_0.pdf](#)

**Paper B** — Mathematical Completeness and Ultraviolet Safety of the 3D+3D Discrete Spacetime Framework (19 pages). Proves well-posedness, counts 6 physical DOF, establishes UV fixed point at NNLO. File: [Paper\\_B\\_Mathematical\\_Completeness\\_UV\\_Safety\\_v1\\_0.pdf](#)

**Clarification Note** — Parameter Registry. Single source of truth for all canonical parameters. File: [Clarification\\_Note\\_Parameter\\_Registry\\_v1\\_0.md.pdf](#)

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## 2. KEY PREDICTIONS (Pre-Registered)

These predictions are falsifiable. A robust determination of  $w_0$  less than -1 (phantom crossing) would definitively exclude this framework.

- **$w_0 = -0.70 \pm 0.03$**  — Test: Euclid + DESI (2026-2027) — KILL SHOT
  - **$w_0 \geq -1$  (structural)** — Test: Euclid + DESI (2026-2027) — KILL SHOT
  - **$\lambda_{13} = 0.856 \text{ Mpc}$**  — Test: Euclid DR1 (2026) — KILL SHOT
  - **$w_a = +0.98$**  — Test: DESI Year 5 (2028) — KILL SHOT
  - **$T_2 = 30 \text{ yr beat}$**  — Test: NANOGrav 20yr (2028) — KILL SHOT
  - **No DM particles** — Test: LZ, XENONnT (ongoing) — Partial
  - **Neutrino mass  $\sim 60 \text{ meV}$**  — Test: KATRIN (2027+) — Partial
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## 3. REPOSITORY STRUCTURE

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### Group 1: Thematic Archives

The full derivation chain of 65+ papers (~900 pages) in 11 volumes:

- **01\_FOUNDATIONS\_CORE.7z** (3.6 MB) — Papers I-IV: axioms, KK reduction, Q-fields, screening
- **02\_GALACTIC\_DYNAMICS.7z** (3.2 MB) — SPARC, WALLABY, HALOGAS, NGC3198, dSphs
- **03\_COSMOLOGY\_LARGE\_SCALE.7z** (6.5 MB) — Cosmic web, Euclid predictions, unified cosmology
- **04\_PARTICLE\_PHYSICS\_SM.7z** (3.2 MB) — 42 SM parameters, fermion masses, mixing matrices

- **05\_MATHEMATICAL\_THEOREMS.7z** (2.5 MB) — Uniqueness, completeness, stability, topology
- **06\_ADVANCED\_TOPICS.7z** (15.4 MB) — Black holes, chronology, thermodynamics, entanglement
- **07\_UV\_COMPLETION\_QFT.7z** (2.2 MB) — Asymptotic safety, NNLO, regulator independence
- **08\_GAMMA\_RAY\_ASTROPHYSICS.7z** (763 kB) — Galactic center, dwarf spheroidals
- **09\_SUPPLEMENTARY\_MATERIALS.7z** (1.3 MB) — Errata, parameter tables, cross-references
- **10\_HIGH\_REDSHIFT\_VALIDATIONS.7z** (673 kB) — JWST high-z, AGN outflows, FRB
- **11\_LAST\_GAP\_SOLVED.7z** (1.1 MB) — Final closure papers, Lagrangian completeness

## Group 2: Consolidated Papers (entry points)

- **Paper\_A\_Dark\_Energy\_Baryogenesis\_v1\_0.pdf** (23 pp) — DE + baryogenesis + strong CP
- **Paper\_B\_Mathematical\_Completeness\_UV\_Safety\_v1\_0.pdf** (19 pp) — Well-posedness + DOF + UV

## Group 3: Reference Documents

- **README\_3D3D\_Zenodo\_v5\_0.md.pdf** — This file (navigation map)
- **Clarification\_Note\_Parameter\_Registry\_v1\_0.md.pdf** — Single source of truth
- **Master\_Mathematical\_Structure\_3D3D\_v4\_.md.pdf** — Complete structure map
- **Symbol\_Book\_3D3D\_EN.pdf** — Notation glossary (~200 symbols)
- **Errata\_Dark\_Energy\_Sector\_v1\_1.pdf** — Corrections (now in Paper A)

## Group 4: Independent Papers

These contain unique results NOT consolidated into Paper A or B:

- Sagittarius A and the Dark Matter Paradigm (Sgr A\*)
- Primordial Supermassive Black Hole Formation (SMBH seeds)
- Discrete Velocity Structure in AGN Outflows (breathing modes)
- Paper\_Fingerprint\_NoGo (no-go theorem)
- Paper\_FRB\_Dispersion\_3D3D (Fast Radio Burst)
- Paper\_BH\_Radial\_Profile\_Decompactification (BH profiles)
- Paper\_GW\_Complete\_MultiBand\_6D (gravitational waves)
- Paper\_Speed\_of\_Light\_6D\_Origin (c from 6D)
- Paper\_XLV\_B\_Dirac\_6D (fermions, matter-antimatter)
- Paper\_Subcritical\_Response\_3D3D (subcritical galaxies)
- Paper\_Mass\_Size\_Golden\_Ratio (mass-size relation)
- Paper\_Dark\_Energy\_Model\_Reconciliation (DE comparison)
- Paper\_Electron\_Mass\_6D\_Direct (electron mass)
- Paper\_Mathematical\_Core\_CMP\_Style (CMP summary)

## Group 5: GER Series (Geometric Evolutionary Ratios)

- Paper\_GER\_I\_Introduction
- Paper\_GER\_II\_Lagrangian\_Derivation
- Paper\_GER\_II\_v3\_Complete\_Derivation (CURRENT)
- Paper\_GER\_III\_Quasicrystals
- Paper\_GER\_IV\_Complete
- Paper\_GER\_Appendix\_D\_Quantitative
- Paper\_GER\_Predictive\_Validation
- Paper\_GER\_RedTeam\_Verification
- Paper\_GER\_II\_v2\_Rigorous (SUPERSEDED by v3)

## Group 6: Atomic Physics Series

- Paper\_Atomic\_Physics\_Master (start here)
- Paper\_Atomic\_Coulomb\_Coupling
- Paper\_Atomic\_Dimensional\_Reduction
- Paper\_Atomic\_Mode\_Selection
- Paper\_Atomic\_QED\_Form\_Factor
- Paper\_Atomic\_Known\_Limitations

## Group 7: N-Body Simulations

- Paper\_NBody\_Cosmological\_Simulation\_3D3D
- Paper\_NBody\_Gadget4\_3D3D

## Group 8: Computational Scripts

- SCRIPT.7z (analysis scripts archive)
  - sim\_3d3d\_cosmo\_v2.py (CURRENT)
  - sim\_3d3d\_cosmo\_v1.py (SUPERSEDED by v2)
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## 4. SUPERSEDED FILES

These files have newer versions or are consolidated into Paper A/B. They remain for historical traceability but should NOT be used as primary references.

### Superseded by Paper A:

- Errata\_Dark\_Energy\_Sector\_v1\_1.pdf (now Paper A, Part I)

### Superseded by Paper B:

- Paper\_Well\_Posedness\_Physical\_Sector (now Paper B, Part I)
- Paper\_Canonical\_Hamiltonian\_Dirac\_Analysis (now Paper B, Part II)
- Paper\_NNLO\_Convergence\_Truncation\_Independence (now Paper B, Part III)
- Paper\_Constraint\_Independence\_Analysis (now Paper B, Part IV)

### Superseded by newer version:

- Paper\_GER\_II\_v2\_Rigorous.pdf (use v3 instead)
  - sim\_3d3d\_cosmo\_v1.py (use v2 instead)
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## 5. READING PATHS

**Path A — Theorist (4 weeks):** Week 1: Paper A + Paper B. Week 2: 01\_FOUNDATIONS\_CORE. Week 3: 05\_MATHEMATICAL + 07\_UV\_COMPLETION. Week 4: 04\_PARTICLE\_PHYSICS.

**Path B — Observer (2 weeks):** Week 1: Paper A + 02\_GALACTIC\_DYNAMICS. Week 2: 03\_COSMOLOGY + 10\_HIGH\_REDSHIFT.

**Path C — Skeptic/Referee (3 days):** Day 1: Paper B (rigor). Day 2: Paper A (predictions). Day 3: Clarification Note.

**Path D — Quick Overview (2 hours):** Paper A abstract + sections 4-5. Paper B abstract + sections 2, 9, 17. Clarification Note. Predictions list above.

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## 6. THEORY SUMMARY

**Core idea:** Spacetime has 6 dimensions with signature  $(-, +, +, +, -, -)$ . Two extra temporal dimensions are compactified on a torus at  $\sim 10$  light-years. The compactification produces scalar fields (Q2, Q3) that modify gravity at galactic scales, explaining dark matter as a geometric effect.

**Key parameters:**

- Signature:  $(-, +, +, +, -, -)$
- $L_2 = 9.5$  ly,  $L_3 = 6.0$  ly (compactification radii)
- $T_2 = 30$  yr,  $T_3 = 19$  yr (oscillation periods)
- $M_{\text{crit}} = 2.43 \times 10^{10}$  solar masses
- $w_0 = -0.70$  (dark energy equation of state)
- $\epsilon_{\text{CP}} = -0.76$  (geometric CP violation)
- $\eta_B = 6 \times 10^{-10}$  (baryon asymmetry)
- Physical DOF = 6

**Definitive exclusion if:**  $w_0$  less than -1 robustly measured, or DM particle directly detected, or  $\lambda_{13}$  differs from 0.856 Mpc at greater than 5 sigma.

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## 7. VERSION HISTORY

- v1.0 (Oct 2025): Initial upload, Papers I-XXII
  - v2.0 (Nov 2025): Papers XXIII-XL, scripts
  - v3.0 (Dec 2025): GER series, atomic series, 11 archives
  - v4.0 (Jan 2026): High-redshift, N-body, GW
  - **v5.0 (Feb 2026): Paper A + Paper B, updated navigation**
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## 8. CONTACT

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We welcome criticism, corrections, and falsification attempts.

*“Non facciamo le cose a meta!”*