

# Errata & Corrigendum: Dark Energy Sector of the 3D+3D Framework Complete Error Genealogy and Corrections

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## 1 Errata & Corrigendum: Dark Energy Sector of 3D+3D Framework

### 1.1 Complete Error Genealogy and Corrections

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**Classification:** ERRATA — Edison Mode Documentation

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### 1.2 1. Purpose

This document provides a complete, transparent accounting of errors identified in the dark energy predictions of the 3D+3D discrete spacetime framework. We trace each error to its origin, explain the propagation chain, and specify the corrections. Per our Edison Mode philosophy: documenting what does not work is as important as documenting what works.

**Papers affected** (Zenodo DOIs to be added upon upload):

- Paper XVI: Unified Cosmology ( $\Omega_m$  value)
  - Paper S8:  $S_8$  and Hubble Tensions Resolution (self-consistent parameters)
  - Paper: Dark Energy Model Reconciliation (model selection)
  - Paper: Cosmological Dark Energy Tests (oscillatory model)
  - Paper FRB: Fast Radio Bursts v1.0–v1.4 ( $w_0$  values) — corrected in v1.7
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1.3 2. Summary of Errors

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#	Error
1	
2	
3	
4	
5	

1.4 3. Detailed Error Analysis

1.4.1 3.1 Error #1: The  $\tau_{\text{sc}} = 10$  Gyr Assumption

**Where it appears:** Paper XVI (Unified Cosmology), Table 2.3: “ $\tau_{\text{sc}} = 10$  Gyr | Source: Screening scale matching | Ref: Paper IV”

**The problem:** Paper IV does not contain a rigorous derivation of  $\tau_{\text{sc}} = 10$  Gyr. The value “10 Gyr” appears as an order-of-magnitude estimate ( $\tau_{\text{sc}} \sim t_{\text{Hubble}}$ ), rounded down for convenience. No self-consistent check against CMB, BAO, or SN data was performed.

**Internal contradiction:** Paper LXV (Cosmological Constant Solution) independently derives  $\tau_{\text{sc}} = 14.4 \pm 1.5$  Gyr using the galactic-cosmological scaling relation:

$$\tau_{\beta} = T_3 \times \left( \frac{\lambda_{\text{Hubble}}}{\lambda_3} \right)^{\alpha} = 19 \text{ yr} \times (3.80 \times 10^5)^{1.592} = 14.4 \text{ Gyr}$$

This derivation has explicit inputs and error propagation. Yet subsequent papers (XVI, Reconciliation) continued using 10 Gyr without acknowledging the discrepancy.

**Consequence (verified numerically):** The formula  $w_0 = 1 + 1/(3H_0 \tau)$  combined with self-consistent CMB fitting ( $\Omega_m$  preserved,  $\Omega_m h^2 = 0.143$  fixed) gives the following exclusion levels against combined BAO + SN data:

$\tau$ (Gyr)	$w_0$
10	
14.4	
20	
30	
50	
100	

**Critical note:** These exclusion levels are computed using constant- $w_0$  cosmology. The actual 3D+3D prediction has  $w(z) \rightarrow 1$  at high  $z$ , which alleviates the tension somewhat. Nonetheless, both  $\tau = 10$  and  $\tau = 14.4$  Gyr are robustly excluded by current data.

#### 1.4.2 3.2 Error #2: Oscillatory Model with $w_a > 0$

**Where it appears:** Paper “Cosmological Dark Energy Tests”, using the damped oscillatory ansatz for  $\delta(t)$ .

**The problem:** This model produces  $w_0 = 0.71$ ,  $w_a = +0.35$ , meaning dark energy becomes *more negative* over time ( $w$  approaching 1 from above as  $z$  increases). DESI DR2 observes the opposite:  $w_a = -1.27 \pm 0.70$  (dark energy becomes *less negative*). Our  $w_a$  has the wrong sign relative to data, at 2.3 tension.

**Root cause:** The oscillatory model is a transient solution. A field stabilizing toward equilibrium has  $\dot{\phi} < 0$  ( $w$  approaching 1 from above), giving  $w_a < 0$  in CPL. The oscillatory model’s  $w_a > 0$  occurs because the field *overshoots* equilibrium, which is a specific initial condition not required by the physics.

**Correction:** The oscillatory model should be classified as a secondary transient, not as a primary prediction.

### 1.4.3 3.3 Error #3: Self-Consistent Parameters in Paper S8

**Where it appears:** Paper S8 (S<sub>8</sub> and Hubble Tensions Resolution), Section 2.3: “From published  $w_0$ CDM analyses with Planck + BAO data [8,9]: For  $w_0 = 0.72$ :  $s_8 = 0.790$ ,  $\sigma_8 = 0.284$ ,  $h = 0.72$ ”

**The problem:** These values are NOT reproducible with a constant  $w_0$ CDM analysis. Our self-consistent calculation (matching the CMB acoustic scale  $\theta^*$  with  $\sigma_8 h^2 = 0.143$  fixed) gives:

- $w_0 = 0.71 \rightarrow H_0 = 59.2 \text{ km/s/Mpc}$ ,  $\sigma_8 = 0.408$

This is a discrepancy of  $H_0 = 12.8 \text{ km/s/Mpc}$  relative to the claimed  $h = 0.72$ . The values  $h = 0.72$ ,  $\sigma_8 = 0.284$  likely come from  $w_0$   $w_a$  CDM analyses (where  $w_a$  is free to become very negative, keeping high- $z$  behavior close to CDM). References [8,9] in Paper S8 may report such analyses without our having verified this distinction.

**Consequence:** The claims that “3D+3D resolves the Hubble tension ( $H_0 \rightarrow 72$ )” and “resolves the S<sub>8</sub> tension ( $s_8 \rightarrow 0.79$ )” are not supported by self-consistent constant- $w_0$  analysis with our predicted  $w_0$  values. These claims must be retracted or heavily qualified.

### 1.4.4 3.4 Errors #4 and #5: FRB Paper Chain

**v1.0–v1.2:** Used  $w_0 = 0.71$  from the oscillatory model. **v1.3–v1.4:** “Corrected” to  $w_0 = 0.52$  from the exponential model with  $\tau = 10 \text{ Gyr}$ . **v1.5–v1.7:** Parametric formulation with  $\tau$  as free parameter (current, correct approach).

Both specific values (0.71 and 0.52) were problematic because the underlying  $\tau = 10 \text{ Gyr}$  was not rigorously derived and is excluded by data. Paper FRB v1.7, uploaded simultaneously with this Errata, resolves this by treating  $\tau$  as a parameter constrained by observations.

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## 1.5 4. What Remains Valid

The following predictions are **robust** and independent of the specific value of  $\tau$ :

1.  $w(z) = 1 + 1/(3H(z)\tau)$  — the formula itself, derived from (t) dynamics (Paper XVI Appendix B)
  2.  $w > 1$  at all  $z$  (no phantom crossing) — a fundamental prediction of 3D+3D, since  $1/(3H\tau) > 0$  for all positive  $H$  and  $\tau$
  3.  $w(z \rightarrow \infty) \rightarrow 1$  (CDM recovered at high redshift) — since  $H \rightarrow 0$  as  $z \rightarrow \infty$
  4.  $w_0 > 1$  at  $z = 0$  (dark energy is dynamical) — consistent with DESI DR2 evidence
  5. **FRB Channel 1** (host DM enhancement from Q-field) — completely independent of dark energy
  6. **FRB Channel 2** (cosmic web periodicity at  $\tau_{13} = 0.856 \text{ Mpc}$ ) — completely independent of dark energy
  7. **Paper LXV** scaling relation  $\tau = 14.4 \text{ Gyr}$  has a legitimate mathematical derivation from the galactic-cosmological connection, though this value is in tension with CMB+BAO+SN data (see Table in Section 3.1). This may indicate that the scaling exponent  $\alpha = 1.592$  requires correction, or that the constant- $w_0$  approximation is insufficient.
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## 1.6 5. Required Corrections

### 1.6.1 Paper XVI v1.0: Unified Cosmology

- Table 2.3: Replace  $\tau = 10$  Gyr with: “ $\tau = 20$  Gyr (observational constraint from CMB+BAO+SN); Paper LXV derives  $\tau = 14.4$  Gyr from scaling relation, which is in tension with data.”
- Add note: “The value  $\tau = 10$  Gyr used in this version was an order-of-magnitude estimate without self-consistent cosmological verification.”
- All downstream  $w_0$  values in the paper must carry the qualifier “for the assumed  $\tau$ .”

### 1.6.2 Paper S8 v1.0: $S_8$ and Hubble Tensions Resolution

- Section 2.3: Remove “ $h = 0.72$ ,  $\tau_m = 0.284$ ” or replace with: “Self-consistent  $w_0$ CDM fit gives  $H_0 = 59$  km/s/Mpc,  $\tau_m = 0.41$  for  $w_0 = 0.71$ . The higher  $H_0$  values cited in [8,9] likely arise from  $w_0$   $w_a$  CDM analyses where  $w_a = 0$ .”
- Section 4 (Hubble tension): Retract “resolves the Hubble tension.” Replace with: “Provides a mechanism for partial Hubble tension reduction, with quantitative resolution depending on the full  $w(z)$  evolution.”
- Section 9 (Conclusions): Temper all claims accordingly.

### 1.6.3 Paper: Dark Energy Model Reconciliation v1.0

- Update  $\tau = 10$  Gyr  $\rightarrow$  “ $\tau = 20$  Gyr (observational)” throughout
- Recalculate  $w_0$  for the exponential model:  $w_0 = 0.76$  ( $\tau = 20$ ) to 0.90 ( $\tau = 50$ )
- The oscillatory model (Model 2) should be explicitly labeled as “disfavored by data ( $w_a$  sign conflict with DESI DR2)”

### 1.6.4 Paper FRB v1.7 (uploaded with this Errata)

- Fully parametric in  $\tau$  with allowed range 20–100 Gyr
- No specific  $w_0$  value claimed; predictions given as function of  $\tau$
- Self-consistent numerical solution verified (Section 4.3)
- Nonlinear broadening of Channel 2 addressed (Section 3.6)
- No further corrections needed

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## 1.7 6. Methodological Lesson

The root cause of all errors was a single unverified assumption ( $\tau = 10$  Gyr) that propagated through multiple papers without cross-checking against observational constraints.

**Prevention protocol for future work:**

1. Every numerical parameter must have an explicit derivation with error bars.
2. Every cosmological prediction must pass a self-consistent CMB+BAO+SN check before publication.

3. When two papers derive different values for the same parameter, the discrepancy must be resolved immediately — not in a subsequent paper.
4. Order-of-magnitude estimates must never be treated as precise values in subsequent calculations.
5. Claims of “tension resolution” require explicit numerical verification with the full self-consistent parameter set, not interpolation from published tables.

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## 1.8 7. Version History

- **v1.0** (February 14, 2026): Initial Errata document
- **v1.1** (February 14, 2026): Red Team corrections —  $\Omega = 14.4$  Gyr exclusion level upgraded from “ $\sim 3$ ” to “ $\sim 8$  (SN)”; Paper LXV validity qualified; FRB reference updated to v1.7; Section 5 corrections strengthened

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*“I have not failed. I’ve just found 10,000 ways that won’t work.”* — Thomas Edison  
 3D+3D Laboratory, Abbiategrasso, Italy — February 14, 2026