

## Appendices

### Appendix A. Core Variables and Notation

This appendix consolidates the principal symbols and variables used across A-15. Its purpose is not to introduce new ontology, but to keep the manuscript internally consistent when the sections are merged into a full paper.

**Still Wave:** Undisturbed informational baseline of reality; the pre-structural state from which configuration differentiation emerges.

$\Omega^E$ : Entropic manifold; the topology of allowed entropy-weighted configurations.

$\Omega^E(t)$ : Accessible entropy-weighted configuration volume at cosmological reporting stage  $t$ . This is not the naive geometric size of the universe.

$\Omega_0$ : Reference configuration volume of the entropic manifold.

$\Delta\Omega^E(t)$ : Dynamical phase contribution to the accessible configuration volume.

$S(x)$ : Local degree of informational deformation; the entropic density field measuring departure from Still Wave equilibrium.

$\Xi(x)$ : Entropic curvature operator, defined schematically by  $\Xi(x) = \partial S(x) / \partial \Omega$ .

$\nabla \cdot \Xi(x)$ : Divergence of the entropic curvature field; measures structural convergence or divergence in the manifold.

$\tau^E(x)$ : Entropic tension field, defined by  $\tau^E(x) = -\nabla \cdot \Xi(x)$ . This is the CUWF reinterpretation of dark-matter-like behavior.

$\beta(t)$ : Breathing rate of the entropic manifold, defined by  $\beta(t) = d\Omega^E/dt$ .

$a^B(t)$ : Breathing acceleration of the entropic manifold, defined by  $a^B(t) = d^2\Omega^E/dt^2$ . This is the CUWF reinterpretation of dark-energy-like observation at the reporting layer.

$\mathbf{K}$ : Entropic-geometry coupling constant linking local structural imbalance to global manifold response.

$\rho(x)$ : Ordinary baryonic mass density used only in comparison language against standard cosmological modeling.

$\Lambda$ : Standard cosmological constant of  $\Lambda$ CDM; retained only when comparing CUWF to conventional cosmology.

$\Lambda^E(t)$ : Effective reporting-level replacement for  $\Lambda$ , written as  $\Lambda^E(t) = \alpha \cdot a^B(t)$ . This is not a new ontological substance.

$\alpha$ : Entropic responsiveness factor connecting breathing acceleration to effective observational acceleration notation.

$t$ : Cosmological or reporting parameter used to describe large-scale evolution. It should not be read as primitive ontological time prior to the Still Wave framework.

## Appendix B. Canonical Equation Summary

The following relations summarize the core mathematical ladder of A-15. They should be read as structural descriptors of the entropic manifold rather than as independent equations for separate substances.

$S(x)$  = local degree of informational deformation

$$\Xi(x) = \partial S(x) / \partial \Omega$$

$$\tau^E(x) = - \nabla \cdot \Xi(x)$$

$$\Omega^E(t) = \Omega_0 + \Delta \Omega^E(t)$$

$$\beta(t) = d\Omega^E / dt$$

$$a^B(t) = d^2\Omega^E / dt^2$$

$$d^2\Omega^E / dt^2 - \kappa \nabla \cdot \Xi(x) = 0$$

$$a^B(t) + \kappa \tau^E(x) = 0$$

$$\Lambda^E(t) = \alpha \cdot a^B(t)$$

$$v^2(r) = G M(r)/r + \kappa \tau^E(r)$$

Taken together, these relations express the full claim of A-15: local structural imbalance in the entropic manifold generates entropic tension, global manifold relaxation generates breathing acceleration, and both observational faces are coupled through one unified structural process.

## Appendix C. Interpretive Rules for Reading A-15

Do not read dark matter in A-15 as an ontological particle sector unless the text is explicitly discussing  $\Lambda$ CDM comparison language.

Do not read dark energy in A-15 as a real energy component. In CUWF it is only an observational label for breathing acceleration at the reporting layer.

Do not read  $\Lambda^E(t)$  as a new hidden fluid or substitute vacuum energy. It is an effective descriptor used to translate breathing acceleration into cosmological comparison language.

Do not read  $\Omega^E(t)$  as the naive size of physical space. It refers to accessible entropy-weighted configuration volume.

Do not read  $t$  as primitive ontological time. It is a cosmological/reporting parameter used to describe large-scale evolution.

Read  $\tau^E(x)$  as a field reaction of the entropic manifold, not as extra mass injection.

Read  $a^B(t)$  as collapse-driven structural reconfiguration, not as energy injection or repulsive pressure.

Whenever a section uses phrases like “dark-energy-like” or “dark-matter-like,” interpret them as observational comparison labels rather than ontology.

## Appendix D. Reference-Tuning Notes for Final Compilation

The current reference base for A-15 is adequate for a working manuscript, but final compilation will be stronger if the references are tuned by role. The goal is not to increase citation count arbitrarily, but to ensure that each major argumentative block of the paper is anchored by the right kind of source.

### D.1 Foundational observational dark-matter references

Keep classic anchors such as Zwicky (1933) and Rubin & Ford (1970). Add one or two later review-level observational summaries if the final version needs a stronger bridge from historical anomaly to modern evidence.

### D.2 Cosmic acceleration and $\Lambda$ references

Retain Riess et al. (1998), Perlmutter et al. (1999), and Weinberg (1989). These are sufficient to anchor the late-time acceleration discovery and the cosmological-constant problem.

### D.3 Precision cosmology baseline

Retain Planck Collaboration results as the main high-level  $\Lambda$ CDM parameter anchor. This gives the paper a clear reference point for what standard cosmology currently treats as the consensus baseline.

### D.4 Structure-formation and halo-model references

Keep at least one canonical halo-profile or large-scale-structure reference such as Navarro, Frenk, and White (1997). This is important because A-15 explicitly contrasts entropic topology with halo scaffolding.

### D.5 Weak-lensing / dark-matter map references

Retain at least one observational weak-lensing anchor such as Clowe et al. (2006) or Massey et al. (2007), since A-15 directly reinterprets lensing excess structurally.

### D.6 Scope discipline for CUWF citations

Because A-15 is a CUWF internal paper, future final compilation may cross-reference A-14 where gravity-as-entropic-slope is required as a prior conceptual basis. If such cross-reference is added, make sure it is framed as internal theory continuity rather than external empirical support.

## Appendix E. Suggested Final Reference Shape

A clean final reference list for A-15 will usually read best if grouped implicitly by argumentative function, even if displayed as one continuous bibliography. The following categories help check balance before publication:

Historical anomaly anchors: Zwicky; Rubin & Ford.

Cosmic acceleration discovery papers: Riess et al.; Perlmutter et al.

Precision cosmology baseline: Planck Collaboration.

Halo / standard structure-formation anchor: Navarro, Frenk, and White.

Weak-lensing / dark-matter-map anchor: Clowe et al.; Massey et al.

Conceptual baseline for the cosmological-constant problem: Weinberg.

Broader beyond- $\Lambda$ CDM review anchor: Bull et al.

If all seven functions are represented, the reference architecture of A-15 will be balanced enough for a theory paper whose main contribution is ontological and structural rather than data-pipeline-driven.