

The Recursive Universe Hypothesis

REALITY BEYOND OUR HORIZON

Black Holes
Multiple Realities
Cosmic Cycles
The Origins of Our World
A Wider Perspective

A scientific exploration
of a deeper cosmic design

A PROJECT BY
TONY CARTER

SEPTEMBER 2026



PROJECT INFORMATION

EXPLORING A CYCLICAL COSMOS

*Same laws.
New beginnings.
Different outcomes.*

1. PROJECT OVERVIEW

The Recursive Universe Hypothesis (RUH) proposes that the universe is cyclical, with each cycle giving rise to a new universe. The fundamental laws of physics repeat, while the detailed outcomes differ in each cycle.

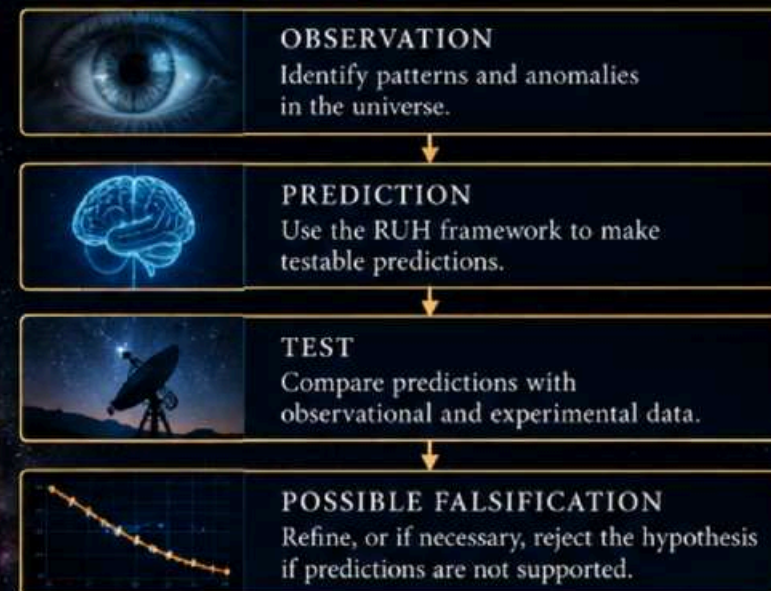
2. CORE IDEA

At the end of each cosmic cycle, information about the physical laws and fundamental constants is preserved — not as ordinary matter, but in a low-entropy information state. This information seeds a new universe, where the process begins again with variation, allowing complexity and diversity to emerge over successive cycles.

3. KEY IMPLICATIONS

- Provides a natural explanation for the fine-tuning of physical constants.
- Unifies cosmic evolution, black holes and the origin of the universe within a single framework.
- Suggests a potentially infinite sequence of universes, each with different outcomes.
- Offers testable predictions through cosmological observations, black hole physics and fundamental constant studies.

4. THE SCIENTIFIC APPROACH



5. AREAS FOR FURTHER RESEARCH

- Cosmic microwave background (CMB) anomalies
- Black hole information and entropy
- Variation (or stability) of fundamental constants
- Large-scale structure and repeating patterns
- Theoretical models of cyclic cosmology
- Potential observational signatures of a previous cycle

*"A continuing journey to understand
our place in a much bigger picture."*

TONY CARTER

AI ASSISTANCE

The Recursive Universe Hypothesis is an independent project by Tony Carter. Artificial intelligence has assisted with research and literature review, critical analysis and hypothesis testing, writing and editing, and illustration and publication design. AI assistance does not constitute scientific validation of the hypothesis.

1. INTRODUCTION — A BIGGER PICTURE

We live in a remarkable universe. From the smallest particles to vast galaxies, from the complexity of life on Earth to the large-scale structure of the cosmos, there is an extraordinary amount to discover, explore and understand.

Modern science has given us a powerful and consistent model of the observable universe, built on careful observation, measurement and experimentation. This model explains a great deal, and continues to be refined as new evidence emerges.

Yet, there remain deep and fundamental questions about the nature of space, time, matter, energy and our place in the cosmos. The Recursive Universe Hypothesis (RUH) is an exploratory idea that considers the possibility that black holes might represent transition points through which new spacetime domains can emerge.

It is not a replacement for established science, but a conceptual framework that looks beyond our current understanding, inspired by what we already know and by what we do not yet know.

A bigger picture awaits...

A JOURNEY OF QUESTIONS

- Established physics and observation
- Open questions and active research
- The Recursive Universe Hypothesis (RUH)

*A bigger perspective,
inspired by what we know
and by what we do not yet know.*

TONY CARTER

EXPLORATION • UNDERSTANDING • POSSIBILITY

2026

2. OUR CURRENT COSMOLOGICAL PICTURE

Our current understanding of the universe is based on a well-established and remarkably successful model that describes how the universe began, how it has evolved, and what it is like today.

This picture is built from many independent lines of evidence, including the cosmic microwave background, the distribution of galaxies, the chemical elements, and the effects of gravity on cosmic scales. While many questions remain, it gives us a solid foundation for further exploration and new ideas.

THE STANDARD MODEL OF COSMOLOGY

The prevailing model is the Λ CDM (Lambda Cold Dark Matter) model. It describes a universe that began around 13.8 billion years ago in a hot, dense state - and has been expanding and cooling ever since.

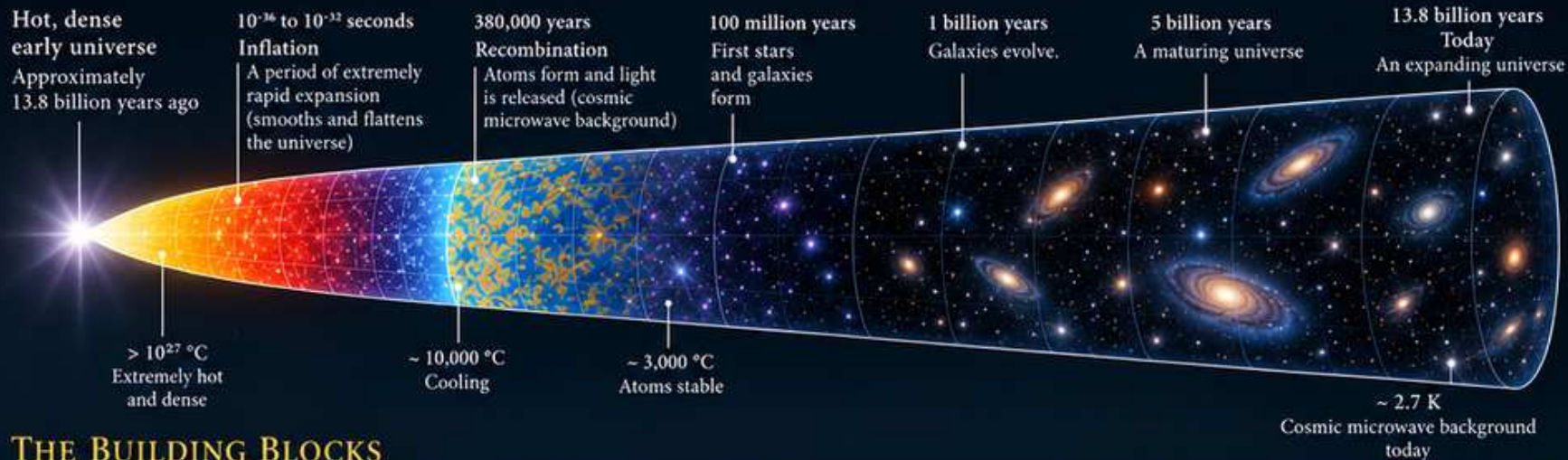
The model includes:

- Ordinary matter (atoms, stars, planets, etc.)
- Dark matter (invisible matter that provides gravity)
- Dark energy (a component driving the accelerated expansion)
- Space and time (described by Einstein's General Relativity)



*The Andromeda Galaxy
2.5 million light-years away
A reminder of the scale and
diversity of the universe.*

A BRIEF HISTORY OF THE UNIVERSE



AN EXPANDING UNIVERSE

Observations show that the universe is expanding, and that this expansion is accelerating.

The most distant galaxies are moving away from us faster than expected, a result attributed to dark energy.

The observable universe is estimated to be about 93 billion light-years in diameter, containing hundreds of billions of galaxies, each with billions of stars.

THE BUILDING BLOCKS

ORDINARY MATTER



Makes up about 5% of the total mass-energy content of the universe. Includes stars, planets, gas, dust and everything we can see.

DARK MATTER



Makes up about 27% of the total mass-energy content of the universe. Does not emit light, but its gravitational effects are clearly observed in galaxies and clusters.

DARK ENERGY



Makes up about 68% of the total mass-energy content of the universe. Drives the accelerated expansion, but its nature remains a mystery.

SPACE AND TIME



Described by Einstein's General Relativity. Space and time are linked and are shaped by the presence of mass and energy.

THE COSMIC WEB



Galaxies are not randomly distributed, but form a vast web of filaments, clusters and voids — the large-scale structure of the cosmos.

3. THE NEED FOR A NEW PERSPECTIVE

Modern cosmology has achieved remarkable success. We can measure the age, composition and large-scale structure of the universe with increasing precision, and the standard model describes how it has evolved from a hot, dense early state to the cosmos we see today.

Yet, despite this success, there are fundamental questions that remain unanswered. These open questions suggest that our current framework, while powerful, may be incomplete and that a deeper perspective could be needed to fully understand the universe and our place within it.

*The more we discover,
the more questions
we find.*

WHY A NEW PERSPECTIVE?

The remaining questions are not minor details. They go to the heart of how the universe began, what it is made of, and why it has the properties we observe. They suggest that there may be a broader framework yet to be discovered — one that can connect these pieces and provide a deeper understanding of the universe and our place within it.

This motivates the search for new ideas, such as the Recursive Universe Hypothesis.

1. DARK MATTER

What is it?



Dark matter makes up about 27% of the total mass–energy content of the universe. We know it exists from its gravitational effects, but we do not know what it is made of.

2. DARK ENERGY

Why is the expansion accelerating?



Dark energy makes up about 68% of the total mass–energy content of the universe. It drives the accelerated expansion, but its nature and origin remain unknown.

3. QUANTUM GRAVITY

How do we unify the two?



We have highly successful theories of the very large (general relativity) and the very small (quantum mechanics), but a complete theory that unifies them remains elusive.

4. BLACK HOLE INTERIORS

What really happens?



Black holes are among the most extreme objects in the universe. What happens to space, time and matter inside the event horizon remains one of the biggest mysteries in physics.

5. THE BEGINNING

Was there an absolute beginning?



The standard model describes the universe from a very hot, dense early state. But we do not know what set the initial conditions or whether there was an absolute beginning.

These gaps are not evidence for RUH.

They are simply the limits of our current understanding — real and important questions that motivate the search for new ideas, such as the Recursive Universe Hypothesis, which seeks to build on established science and explore what might lie beyond it.

*Could apparently separate
cosmological mysteries be
manifestations of a larger structure
that we have not yet recognised?*

4. A REALITY OF MANY LEVELS

The Recursive Universe Hypothesis (RUH) suggests that our universe is one level in a much larger reality. Black holes may act as natural transitions, with the potential to give rise to new universes at the next level. The process could repeat across many levels, creating a cosmic hierarchy rather than a single, isolated universe.

Each new universe inherits the general physical laws, such as relativity and quantum mechanics, while variations in initial conditions, angular momentum and other factors can lead to different outcomes.



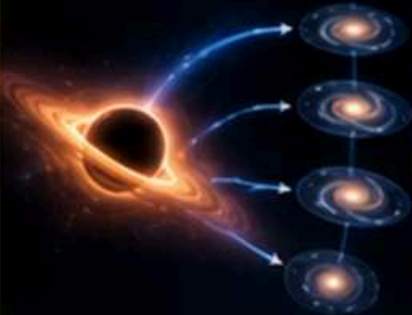
*The more we discover,
the more questions
we find.*

1. A MULTI-LEVEL REALITY



Our universe may be one level in a larger, possibly infinite, hierarchy of universes.

2. RECURSIVE TRANSITIONS



Black holes may act as natural transitions, with the potential to give rise to new universes at the next level.

3. INHERITANCE AND VARIATION



Each new universe inherits the general physical laws, but small differences in initial conditions and angular momentum can lead to different outcomes.

4. A DIVERSE COSMIC FAMILY



The same underlying process can produce a wide variety of universes, each with its own structure, properties and potential for complexity.

5. A FRACTAL ANALOGY



The pattern may resemble a fractal, such as the Mandelbrot set, where a simple process generates complexity across scales. This is an analogy, not a prediction.

Different universes — different outcomes — the same underlying process.



5. THE BLACK-HOLE PINCH POINT

Black holes are among the most extreme objects in the universe. The RUH suggests they may act as a gravitational pinch point, where space, time and matter are driven to a critical state that could give rise to a new universe at the next level.

This is a hypothesis, not an established theory, but it provides a possible link between our universe and the wider recursive structure.

Sometimes looking beyond means asking what might lie on the other side of what we already understand.
— Tony Carter

1. WHAT WE KNOW



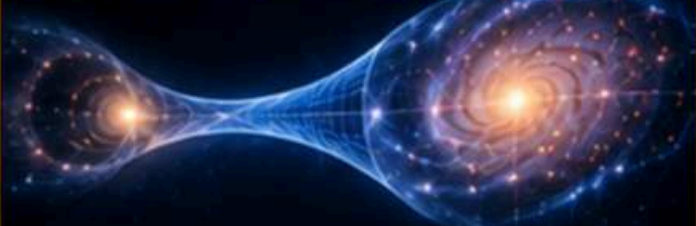
- Black holes form when massive stars collapse.
- They are described by general relativity, with a singularity at the centre and an event horizon.
- Rotating (Kerr) black holes carry angular momentum, which influences their structure and the surrounding space-time.
- These are well-established results of modern physics.

2. THE UNKNOWN



- What really happens inside the event horizon?
- How do space, time and matter behave at the singularity?
- Can the equations of physics be extended beyond this point?
- These questions remain unanswered.

3. WHAT RUH PROPOSES



- The extreme conditions inside a black hole may represent a transition to a new level of reality.
- The collapse and rebound could give rise to a new space-time, with inherited physical laws but modified initial conditions.
- This is a hypothesis, not established science, but it offers a possible explanation for how new universes can emerge.

ESTABLISHED PHYSICS

Based on observation and mathematical theory

RUH CRITICAL-STATE PROPOSITION

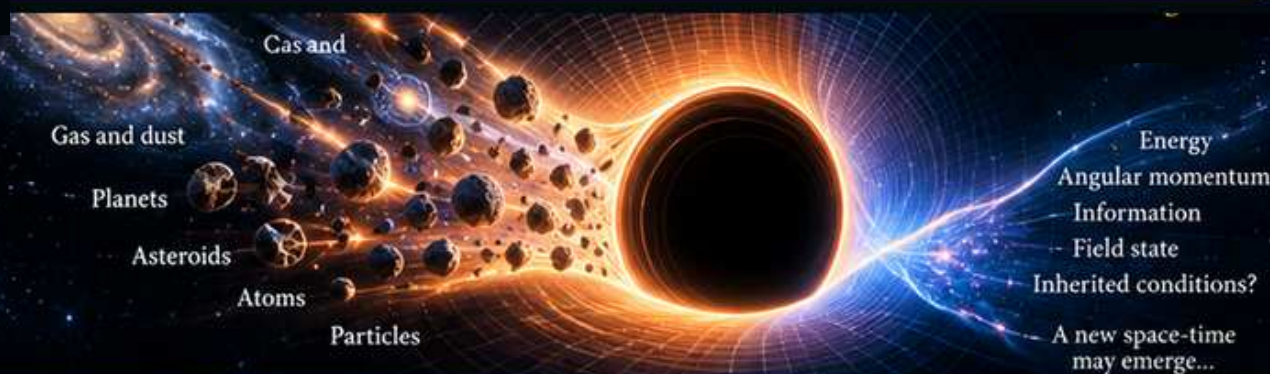
$$C = F(M, J, E, \dot{M}, \rho, \dots)$$

$$C \geq \text{Critical}$$

6. WHAT HAPPENS TO MATTER?

From familiar forms to the unknown

As matter falls into a black hole it experiences increasingly extreme conditions. Established physics can describe what happens up to the event horizon, but what occurs beyond that point remains unknown. The Recursive Universe Hypothesis suggests that matter and its properties may not simply be destroyed, but could be transformed and inherited at a new level of reality.



1. ORDINARY MATTER



- Black holes attract all forms of matter and energy.
- Stars, gas, dust, planets, asteroids and even light can be drawn in.
- Everything is affected by the black hole's gravity, regardless of its composition.

2. EXTREME CONDITIONS



- As matter approaches, tidal forces become extreme.
- Objects are stretched, compressed and heated to enormous temperatures.
- Atoms are stripped, and matter is broken down into fundamental particles.

3. COMPRESSION AND TRANSFORMATION



- Matter is compressed to extreme densities.
- Atoms are broken into nuclei and then fundamental particles such as protons, neutrons and electrons.
- Energy increases dramatically, and the original form of matter is lost.

4. THE EVENT HORIZON



- This is the point beyond which nothing can return.
- From an outside observer's perspective, infalling matter appears to slow and fade.
- What happens beyond this boundary cannot be directly observed.

5. THE UNKNOWN



- Inside the event horizon our current physics no longer applies.
- Matter may continue towards a singularity, but the true process is unknown.
- It may not be destroyed, but transformed into a form we cannot yet describe.

6. RUH POSSIBILITY



- The Recursive Universe Hypothesis suggests that matter and its properties may be inherited at a new level of reality.
- Energy, angular momentum, information and field state could seed a new space-time region.
- This is a possibility, not an established fact.

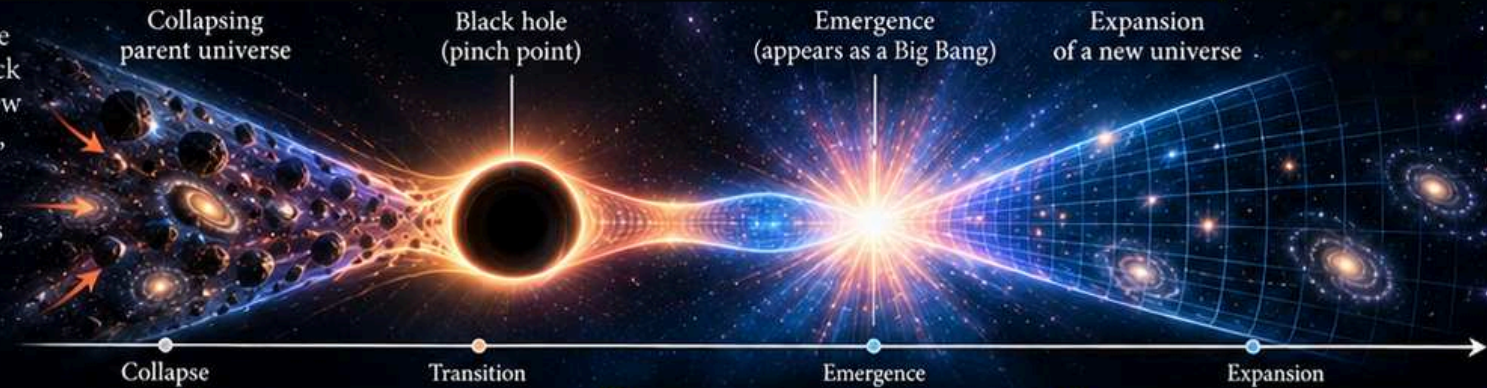
The end of one form may be the beginning of another.

7. EMERGENCE = BIG BANG?

From collapse to expansion

In the Recursive Universe Hypothesis, a new universe may emerge from the extreme conditions inside a black hole. The emergence could appear, from within the new universe, as a Big Bang — the beginning of space, time, matter and energy in that new level of reality.

Our Big Bang may therefore be the result of a previous universe collapsing, with its conditions inherited and transformed at the pinch point.



1. COLLAPSE



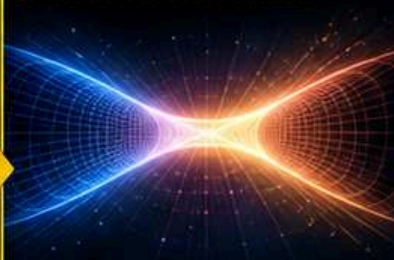
- A massive universe eventually reaches a state where gravity dominates.
- Galaxies, stars, gas, dust and dark matter are pulled towards black holes.
- Matter and energy become increasingly concentrated.
- This collapse may lead to the formation of one or more black holes.

2. THE PINCH POINT



- A black hole represents an extreme transition region where known physics breaks down.
- It acts as a gravitational pinch point, possibly connecting to a new level of reality.
- The detailed process inside the event horizon is unknown.

3. TRANSFORMATION



- The inherited conditions from the parent universe may be transformed.
- Energy, angular momentum, information, field state and fundamental parameters could be reconfigured in a different form.
- This is not a simple transfer of existing matter, but a restructuring under extreme conditions.

4. EMERGENCE (A NEW BIG BANG?)



- A new space-time may emerge from the transition, appearing (from within) as a Big Bang.
- Space, time, matter and energy begin to expand from an extremely hot, dense state.
- The initial conditions of this new universe reflect, in a transformed way, the properties of the parent universe.
- Each emergence may be unique, shaped by the conditions at the pinch point.

5. A NEW UNIVERSE



- The new universe expands and evolves, following its own physical laws and constants (which may differ from the parent).
- Galaxies, stars, planets and possibly life can eventually form.
- To observers within, it simply appears as the beginning of everything.
- There may be many such emergences, each with its own characteristics, forming a multi-level, recursive cosmos.

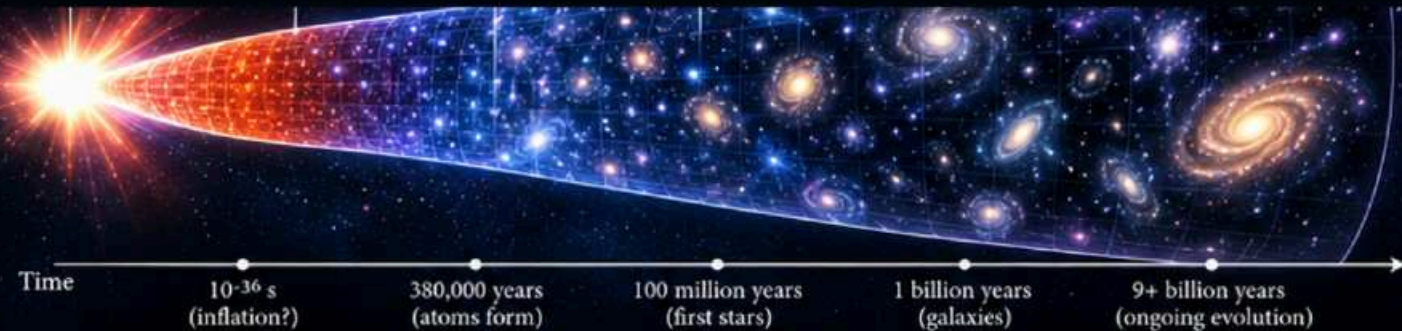
Perhaps every ending is also a beginning.

8. EXPANSION CREATES DIVERSITY

How inherited conditions may lead to different outcomes

Small variations in the initial conditions, combined with physical processes such as gravity, lead to a vast diversity of outcomes — galaxies, stars, planets and possibly life.

In the Recursive Universe Hypothesis, each new universe produced through a black hole may develop its own unique characteristics, shaped by the inherited conditions and natural variation during expansion.



1. EARLY EXPANSION



- The new universe begins in a hot, dense and rapidly expanding state.
- It may be relatively simple in structure.
- Physical laws and constants (inherited and/or emergent) set the framework for evolution.

2. FORMATION OF MATTER



- As the universe cools, energy condenses into particles, then atoms.
- Hydrogen and helium form first, followed by heavier elements inside stars.
- Matter begins to clump under gravity, forming the seeds of structure.

3. STARS AND GALAXIES



- Gravity pulls matter together to form stars and galaxies.
- Stars create heavier elements, enriching the universe.
- Galaxies cluster into vast cosmic web structures, with voids in between.
- Each universe may develop different structures and distributions.

4. PLANETS AND LIFE?



- Around some stars, planets may form from dust and gas.
- Given the right conditions, chemical complexity can increase over time.
- In some universes, life may arise; in others it may not.
- The potential for life depends on the specific conditions in each universe.

5. ENDLESS VARIATION



- Each new universe may be unique, with different physical laws, constants and structures.
- Expansion allows countless variations, from simple to highly complex.
- This diversity is a natural outcome of the recursive process, not a one-off event.
- Our universe is one example in a much larger, ongoing story.

Expansion turns possibility into reality.

9. TIME IS EMBEDDED

TIME HAS THE EXTENT OF EXISTENCE

In the Recursive Universe Hypothesis, time is not a separate container in which events happen. Time is embedded within the universe and defined by its history. Each universe has its own timeline, and when a new universe emerges, its future becomes part of the overall extent of time.

The more universes that exist, and the further their histories extend, the further time extends. New existence creates new time.

“We do not travel through time.
We are time.”

Time is the unfolding of existence itself — the sequence of change within and across all universes. As new universes emerge, they add to what exists, and in doing so, extend the reach of time.



QUANTUM INHERITANCE & TEMPORAL CLARIFICATION

APPROVED CONCEPTUAL AMENDMENT • 24 OCTOBER 2026

1. QUANTUM-LEVEL VARIABLE INHERITANCE

RUH proposes that properties inherited from a parent domain may persist through the black-hole pinch point, but need not be expressed consistently. At the quantum level, their distribution or manifestation may vary unpredictably. Recursive emergence therefore suggests continuity of physical ancestry without identical outcomes.

2. POSSIBLE REORGANISATION AT THE PINCH POINT

Extreme conditions at the proposed transition may require a physical description beyond our present theories. Inherited quantum properties might be reorganised, potentially leading to different emergent physical characteristics or effective laws. This possibility is not a demonstrated quantum-gravity mechanism.

3. THE TEMPORAL DIMENSION

Within RUH, time is intrinsic to a universe's physical existence. "Sharing time" means that entities coexist within a common temporal domain, whatever their physical states; it does not imply identical elapsed time or an absolute universal present. Distinct emerging universes may possess distinct temporal structures, without requiring an overarching cosmic clock.

4. SCIENTIFIC STATUS

These statements clarify RUH rather than change its foundational proposal. The transfer of matter or information through a black-hole transition, the nature of quantum inheritance, and any differences between emergent physical laws remain unverified. A viable physical theory would require a defined mechanism and testable consequences.

The universe repeats the process — not the outcome.

10. RECURSIVE GRAVITY & THE DARK-MATTER QUESTION

Can Recursion Explain What We Observe?

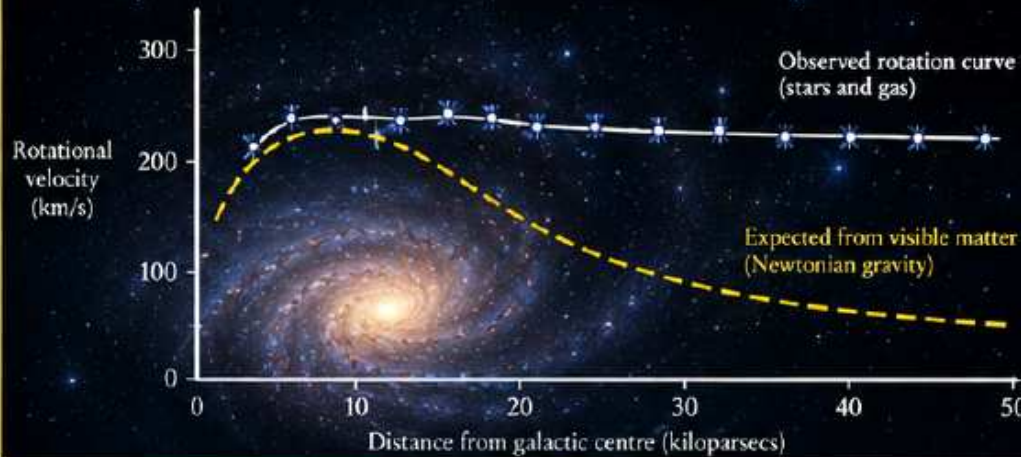
10.1 The Observation

Stars in spiral galaxies orbit at high speeds, even far from the centre. According to Newtonian gravity, their speeds should decrease with distance, but observations show they remain roughly constant — a “flat” rotation curve.



Spiral galaxy M33
(Image: NASA, ESA)

10.2 Galaxy Rotation Curves



10.3 The Standard Explanation

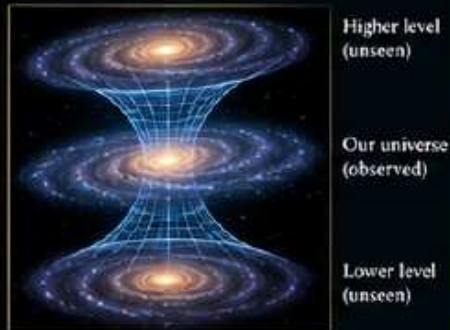
The Λ CDM model introduces dark matter — an unknown form of matter that does not emit, absorb or reflect light, but exerts gravity. It is very successful at explaining many observations, including galaxy rotation curves, gravitational lensing and large-scale structure.

Key characteristics (Λ CDM)

- Non-baryonic (not made of atoms).
- Does not emit, absorb or reflect light.
- Interacts mainly through gravity.
- Forms a halo around galaxies.
- Explains many cosmological observations.

10.4 A Recursive Perspective

In the Recursive Universe Hypothesis, gravity in our universe may be influenced by matter and structure in other levels of reality. This could provide an additional gravitational component that becomes more significant at large distances from galactic centres.



Gravitational influence from other levels
(possible representation)

10.5 The Required Gravitational Behaviour

To explain flat rotation curves, the additional gravitational acceleration must fall off more slowly with distance than the usual $1/R^2$ decline from visible matter.

Standard Newtonian gravity (visible matter)

$$a_N(R) = \frac{GM_{\text{visible}}}{R^2} \propto \frac{1}{R^2}$$

Additional gravitational component (required)

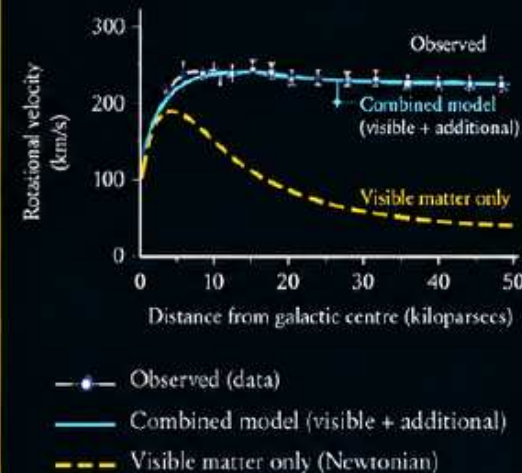
$$a_{\text{add}}(R) \propto \frac{1}{R}$$

This $1/R$ -like behaviour provides the roughly constant rotational velocity observed at large distances:

$$v(R) = \sqrt{R [a_N(R) + a_{\text{add}}(R)]} \approx \text{constant}$$

10.6 Fitting the Observations

The combined effect of visible matter and an additional $1/R$ -like component can reproduce the observed rotation curves.



10.7 Important Clarifications

- The required $1/R$ -like behaviour is reverse-engineered from observations.
- It has not yet been derived from the Recursive Universe Hypothesis.
- The mechanism by which recursive coupling could produce this behaviour is speculative.
- This is an area for further research, not a confirmed prediction.
- The recursive model must also be consistent with other observations, such as gravitational lensing and the cosmic microwave background.

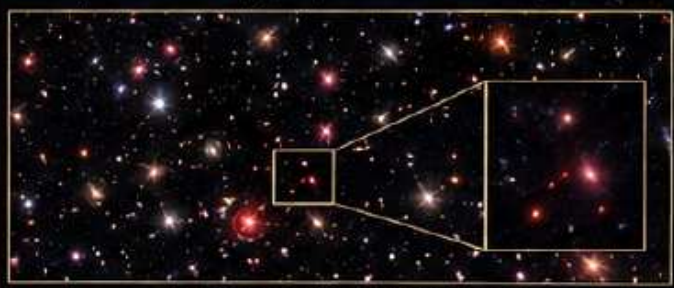
10.8 Key Points

- Galaxy rotation curves require more gravity than visible matter provides.
- This is usually explained by dark matter.
- A $1/R$ -like additional component can reproduce the observations.
- In the recursive model, this could arise from gravitational coupling to other levels.
- The required behaviour is based on observations and not yet derived from the hypothesis.

11. JWST LITTLE RED DOTS — AN OBSERVATIONAL TEST CASE

11.1 A New View of the Early Universe

JWST can detect extremely distant and faint galaxies, looking back to when the universe was less than a billion years old. Among the most intriguing discoveries are compact red sources with unusual properties that challenge existing models of early galaxy formation.



Portion of the JWST deep field (CEERS)
Numerous compact red galaxies are visible (Image: NASA, ESA, CSA, STScI)

11.2 Abell2744-QSO1 ($z \approx 7.1$)



One of the most distant and massive known black holes, existing when the universe was less than 800 million years old.

Redshift (z)	≈ 7.1
Age of universe	≈ 770 million years
Estimated black hole mass	$\approx 1.6 \times 10^9 M_{\odot}$
Host galaxy	Compact, red, massive
Significance	Challenges how such a massive black hole could form so early

Abell2744-QSO1
(Image: NASA, ESA, CSA, STScI)

11.3 GLIMPSE-17775 ($z \approx 10.6$)



An extremely distant, compact red galaxy with a massive black hole, seen when the universe was only about 450 million years old.

Redshift (z)	≈ 10.6
Age of universe	≈ 450 million years
Estimated black hole mass	$\approx 10^8 - 10^9 M_{\odot}$
Host galaxy	Compact, very red
Significance	One of the earliest and most massive black holes observed to date

GLIMPSE-17775
(Image: NASA, ESA, CSA, STScI)

11.4 Common Properties of Little Red Dots

- Compact size (a few thousand light years).
 - Very red colours (likely due to older stars, dust or black hole activity).
 - High inferred masses for both the galaxy and central black hole.
 - Often appear earlier and more evolved than expected in standard models.
 - May represent a short-lived phase in galaxy evolution.
- Possible Explanations (Conventional)

 - Rapid “direct collapse” of gas into massive black holes.
 - Very efficient early star formation.
 - Heavy dust obscuration.
 - Selection effects (we see the most extreme examples).

11.5 What Do These Observations Mean?

Little red dots show that massive galaxies and black holes can exist much earlier than previously thought. This places strong constraints on models of galaxy formation and black hole growth, and may require new physical processes or a revision of existing models.



Examples of little red dots (LRDs)
(Image: NASA, ESA, CSA, STScI)

Artist's impression of an early galaxy with a rapidly growing black hole
(Image: NASA, ESA, CSA, STScI)

11.6 Relevance to the Recursive Universe Hypothesis

In a recursive multiverse, some early black holes might arise from inherited conditions at the transition between universes, potentially forming more quickly than in standard cosmological scenarios. The existence of massive black holes so early could be consistent with this idea, but it is not unique to it.

Evidence, Not Proof

- Little red dots are real and significant.
- They are consistent with, but do not uniquely prove, the Recursive Universe Hypothesis.
- Conventional models may still explain these observations.
- More data and analysis are needed to determine whether any features uniquely favour a recursive origin.

11.7 The Key Question

Can conventional early-black-hole formation explain everything we see, or does anything remain that uniquely favours the recursive model?

12. FROM EMERGENCE TO EARTH



THE INGREDIENTS FOR LIFE — AS WE KNOW IT

Carbon, hydrogen, oxygen, nitrogen, phosphorus and other elements are central to life as we know it on Earth. Whether life elsewhere must depend upon the same chemistry remains an open question.

Earth is one outcome, not an objective or inevitable destination.

THE PATHWAY

emergence → expansion → structure → chemical enrichment →
planetary systems → possible life

"The recursion provides the ingredients; expansion and randomness determine what eventually emerges."

— Tony Carter

13. HOW WE TRY TO BREAK THE HYPOTHESIS



- Observation: galaxy dynamics require more gravity than visible baryons provide under conventional gravity.
- RUH test: any recursive-gravity term must reproduce rotation without galaxy-by-galaxy arbitrary tuning.
- Falsification: failure across rotation, lensing, clusters, CMB or large-scale structure weakens the recursive-gravity proposal.



- Observation: lensing maps trace gravitational mass independently of galaxy rotation.
- RUH test: the same proposed gravitational contribution must fit lensing and cluster behaviour as well as rotation.
- A fit to rotation alone is not sufficient.



- Established: black holes are extreme gravitational systems; their interiors remain unresolved by a complete quantum theory.
- RUH proposition: pinch points may be associated with a transition to emergent spacetime.
- Test: seek a physically motivated, distinctive signature—not merely an unexplained anomaly.



- JWST LRDs include rapidly accreting early black holes. GLIMPSE-1775 is at $z = 3.5$, Abell2744-QSO1 existed about 700 million years after the Big Bang.
- LRDs are test cases, not evidence for RUH.
- RUH must predict something distinguishable from conventional seed-and-growth models.



- Established: primordial nucleosynthesis produced mainly hydrogen and helium, with small amounts of lithium.
- Heavy elements required for rocky planets and life were produced later by stars and stellar events.
- Any RUH inheritance proposal must remain consistent with observed primordial abundances.

13.6 Roman — The Next Observational Test



- Nancy Grace Roman Space Telescope launched 30 August 2026 aboard Falcon Heavy and is in its journey/commissioning phase toward Sun-Earth L2.
- RUH questions recorded before principal science results:
- Will black-hole-to-host relationships change systematically with cosmic age?
- Will population statistics strengthen conventional seed-and-growth models or leave a reproducible anomaly?

13.7 Other Independent Tests



- Will lensing maps remain consistent with conventional dark-matter distributions?
- Can one RUH framework address galaxy dynamics, clusters, the CMB and large-scale structure together?
- Can black-hole physics supply a derived mechanism rather than a phenomenological fit?

13.8 Predictions Recorded — September 2026



- Roman's wide-field surveys should sharply improve population statistics for early galaxies and black holes.
- Conventional explanations must be allowed to win.
- What observation would make us abandon the recursive explanation?

13.9 What Would Count Against RUH?

- A recursive-gravity term cannot fit rotation, lensing, clusters, CMB and large-scale structure with one coherent framework.
- Early black-hole populations are fully explained without any distinctive RUH residual.
- No physically motivated transition mechanism or unique observational prediction can be derived.

13.10 The Standard

- A useful hypothesis must risk being wrong.
- Observation → Prediction → Test → Possible Falsification.
- Failed tests are recorded rather than explained away.

"If the universe says 'no', we listen.

If it says 'maybe', we investigate.

If it says 'yes', we demand another test."

— Tony Carter

14. THE HYPOTHESIS IN ONE PAGE

A simple idea with profound possibilities

The Recursive Universe Hypothesis proposes that black holes may act as natural transition points between levels of reality, allowing matter, energy, space and information to seed new, emerging universes. Our universe could be one instance in a much larger, ongoing cosmic cycle.

A Parent Universe
An existing spacetime with galaxies, stars, planets and black holes.

A Black Hole
A gravitational pinch point where extreme conditions transform what falls in.

The Transition
Matter, energy, space and information may be reconfigured and seed a new spacetime.

A New Universe Emerges
A new spacetime with its own physical laws, constants and unique characteristics.

Many Possibilities
Each black hole may seed a different universe. The process could happen many times, on many scales.

A cosmic cycle — not a single beginning or end.

1. THE CORE IDEA

- Black holes may act as natural transition points between levels of reality.
- Extreme conditions inside a black hole can transform matter, energy, space and information.
- This may seed a new, emerging universe, rather than ending in a singularity.
- Our universe may be one instance in a much larger, ongoing recursive process.

2. KEY IMPLICATIONS

- Each new universe may inherit certain conditions from its parent, but also develop its own unique characteristics.
- The process may occur many times, on many scales.
- Variations in inherited conditions and stochastic processes can lead to diverse outcomes.
- Universes may have different physical laws, constants, structures, galaxies, stars, planets and possibly life.

3. WHAT RUH DOES NOT SAY

- It does not require intact matter, atoms, planets or dust to pass through a black hole and reappear.
- It does not claim to explain the specific conditions of our universe.
- It does not predict that life is inevitable or common.
- It does not suggest our universe has a purpose or is the final outcome.
- It is a hypothesis, not an established theory.

4. WHAT COULD TEST IT

- Observations of very early universe objects (e.g. JWST little red dots).
- Evidence of black hole remnants in the cosmic microwave background.
- Consistent observational signatures across multiple wavelengths (e.g. Roman, Euclid, 21 cm).
- Tests for possible imprints in physical constants, large-scale structure or galaxy properties.
- Any observation that directly contradicts the core idea.

5. WHY IT MATTERS

- Offers a possible explanation for the beginning of our universe without a special initial event.
- Links black holes, cosmology and the origin of structure into a single framework.
- Provides a testable idea that can be explored with current and future observations.
- Encourages new questions about the nature of reality, our place in the cosmos and what may lie beyond.
- Keeps the spirit of curiosity and exploration alive.

● ESTABLISHED PHYSICS

General relativity, black holes, cosmic expansion, nucleosynthesis, structure formation.

● OPEN QUESTIONS

Nature of singularities, information fate, very early objects, possible imprints, variations in physical laws.

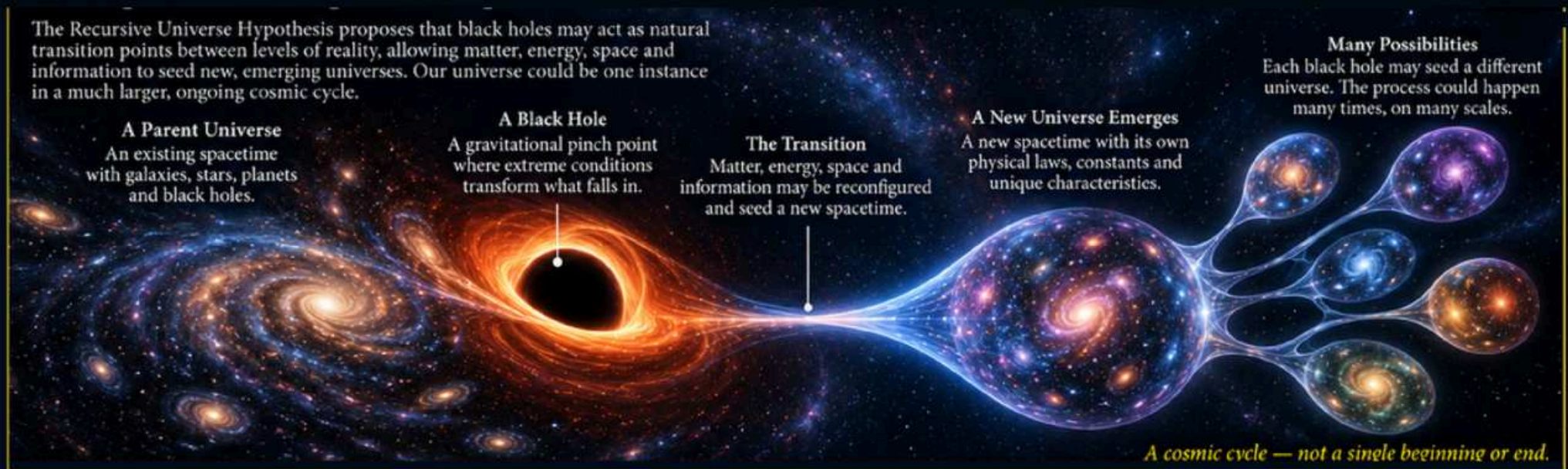
● RUH PROPOSITIONS

Black holes as transition points, seeding new universes, inheritance of conditions, a larger recursive process.

A BIGGER PICTURE AWAITS...

15. THE RECURSIVE UNIVERSE — TESTING THE MODEL

What observation must decide



WHAT RUH PROPOSES — AND DOES NOT YET SHOW

RUH proposes that black holes may be transition points from which new spacetime domains can emerge, with recursion capable of branching and producing different outcomes. It does not yet provide a demonstrated mechanism for that transition, a first-principles inheritance law, or a unique observational signature.

THE DARK-MATTER QUESTION

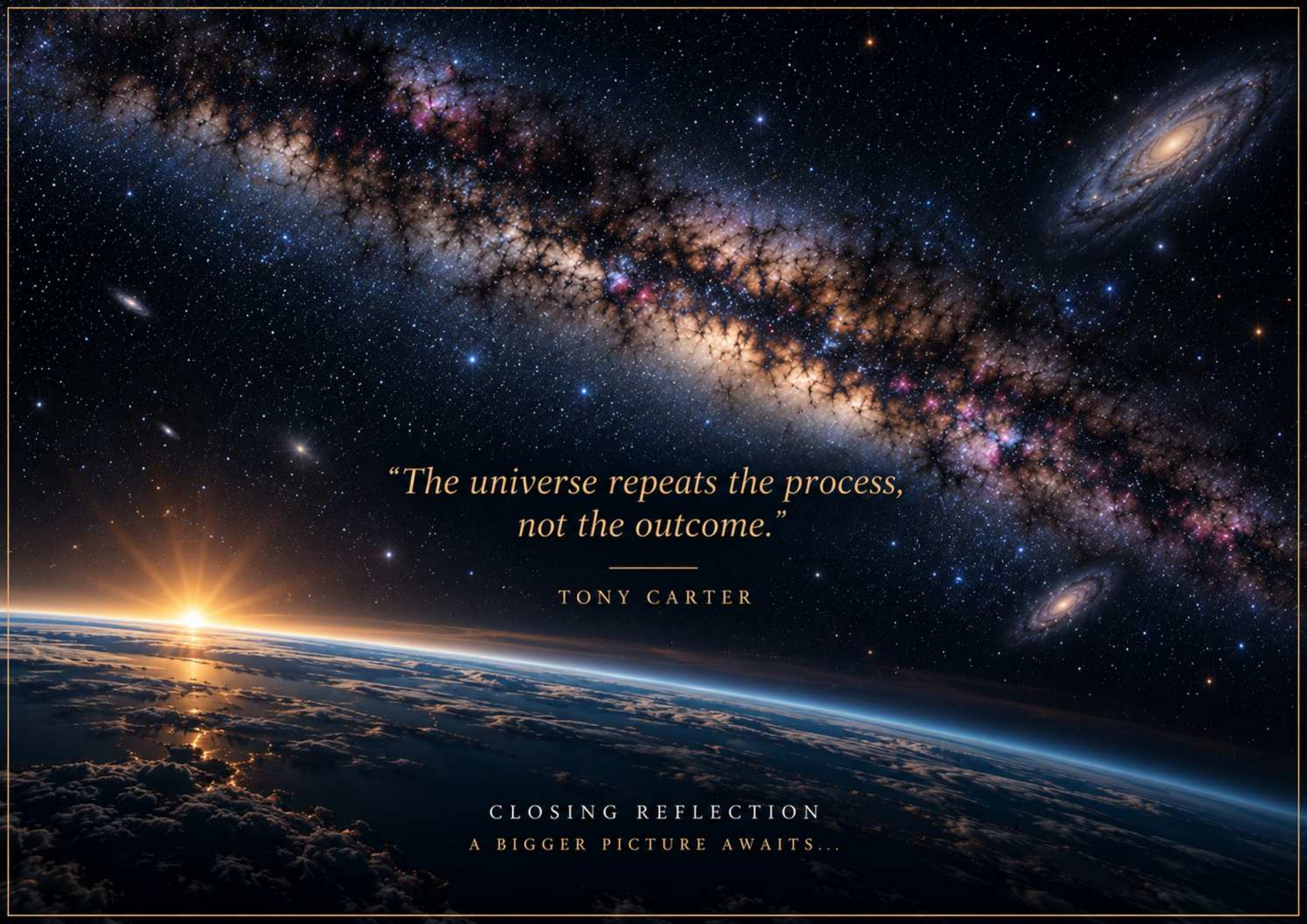
RUH explores whether an inter-level gravitational signature could contribute to phenomena normally attributed to dark matter. This remains speculative. Any alternative must explain galaxy rotation, gravitational lensing, clusters, the cosmic microwave background and large-scale structure together.

THE STANDARD RUH MUST MEET

OBSERVATION → PREDICTION → TEST → POSSIBLE FALSIFICATION

Its value depends upon whether it can eventually produce distinctive predictions that survive observation. A hypothesis remains valuable only for as long as it remains open to being wrong.

"The universe repeats the process, not the outcome." — Tony Carter

A composite image featuring a view of Earth from space in the lower half, showing the horizon, clouds, and a bright sun or star on the left. The upper half is dominated by the Milky Way galaxy, showing its spiral arms and star clusters in vibrant colors like orange, pink, and blue against a dark cosmic background. Other distant galaxies are visible in the upper right.

*"The universe repeats the process,
not the outcome."*

TONY CARTER

CLOSING REFLECTION
A BIGGER PICTURE AWAITS...

FINAL THOUGHTS

Curiosity across generations

The Recursive Universe Hypothesis is a personal exploration — an attempt to look beyond what we know, to connect the very large with the very small, and to consider the possibility that our universe is part of a much larger, ongoing process.

It is not a claim to have the answers, but a framework to ask new questions, to think differently and to appreciate how much remains unknown.

Science advances through curiosity, open minds and a willingness to explore ideas — even those that may one day be proven wrong. That is part of the journey, and part of the excitement.

I am grateful to everyone who has inspired my thinking along the way, and to the scientific community whose remarkable work continues to reveal the wonders of our universe.

And, of course, to Cooper — for the companionship, the daily perspective and the reminder to always appreciate the present moment.

*Every ending may be a new beginning
in a larger story.*

*“Where did it all start, Cooper?
Perhaps we’ll never know.”*

— Tony Carter

