Illuminating Dark Matter & Energy
Living in a Fractal Universe
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Overview

The two most profound cosmological mysteries that have long eluded **scientific understanding are dark matter and dark energy**. Despite decades of research, thousands of brilliant scientists, billions of dollars in funding, and the most advanced technologies ever created, **we have yet to detect these phenomena directly**. We can only observe them indirectly—**dark matter** through **galactic rotations** that prevent galaxies from disintegrating under their own spin, and **dark energy** through **the universe's expansion**. Why do these mysterious components continue to evade us? The answer is revolutionary: **dark matter is not matter, and dark energy is not energy**. Scientists have often misunderstood these phenomena, which explains their elusive nature. In this paper, I show how our **universe is fractal**, operating through **recursive propagations (RPs)—a discrete and finite alternative to spacetime**. **Dark matter is bounded RPs** existing within the fractal memory of existence called *The Record*, forming convergence and divergence zones. *The Record* provides coherence and structure for all things, including galaxies, **explaining why gravity alone cannot account for galactic stability**. **Dark energy is unbounded RPs** existing only in empty space and light, revealing that the universe does not expand through force, but **unfolds as an inherent requirement of existence,** recursively updated. By analyzing galactic spin rotation data (SPARC), supernova expansion data (Pantheon+), and the life cycle of stars (Gaia DR3 Archive), **I empirically confirm the fractal universe**, with over 96% **of observed velocity** by radius explained in galactic rotations and 95% **explained for supernova** expansion using only the cubic regressions predicted by *The Theory*, no adjustments, infinities, or hypothetical particles, forces, or computational fudge factors—results impossible in continuous spacetime models. I further show that it is not just the universe that is fractal, but the phenomena in it, with a **cubic trajectory in the life cycle of stars,** nearly double the linear trajectory. These findings illuminate the darkness of the cosmos, allowing us to finally see **the beauty of our fractal universe** and **what it is like to live in it**.

Background & Findings

Our universe is just… **breathtaking in its profound beauty and wonder**. When we gaze into the cosmos, we encounter nebulae and galaxies of such vast scales that they challenge our human comprehension. Humanity, time and time again, **has surpassed what we even thought was possible**, launching technologies into space to see things we never thought we could see… and to understand things we thought we could never understand. Yet, behind these awe-inspiring moments remains a fundamental mystery: **how a majority of the universe works**. **This enigma permeates every observation**, appearing strikingly when we gaze into the distant universe.

Using the most advanced technologies, cosmologists have uncovered a **remarkable mystery**. According to our best estimates, **only $\sim 5\%$** of the universe **consists of observable matter and energy**. This stuff makes up everything familiar to us: people, objects, and natural phenomena. The remaining $\sim 95\%$ **remains a profound mystery**. Despite the use of sophisticated instruments and extensive research, scientists have been unable to detect or measure these missing components. **They do not appear** in any telescope, electromagnetic scan, or space

probe—**they are simply… absent**. Scientists have termed this enigmatic ∼**95**% **"dark matter"** and **"dark energy."** The fundamental question remains: Why is most of our universe fundamentally unknowable and invisible to our most advanced scientific efforts? **What are we missing or doing wrong? What's going on in our universe?**

Cosmologists and physicists have developed sophisticated theories to address this cosmic puzzle. The prevailing explanation for **dark matter proposes an undiscovered particle** that provides additional mass to galaxies, thereby **adding significant gravity to hold them together**. Observations show galaxies spinning at speeds that should theoretically tear them apart, yet they remain intact—a phenomenon attributed to dark matter. Current models estimate **dark matter comprises approximately ∼27% of the universe**.

Dark energy proposes an unseen energy that explains the universe's expansion. Researchers theorize that an unknown force is causing galaxies to move apart at increasingly rapid rates. Although we can observe its apparent effects in the expanding universe, we have never measured this energy, despite its **estimated presence of around ∼68% of the universe**. Despite remarkable technological advancements, **dark matter particles and dark energy forces remain undetected**, raising profound questions about our understanding of the universe.
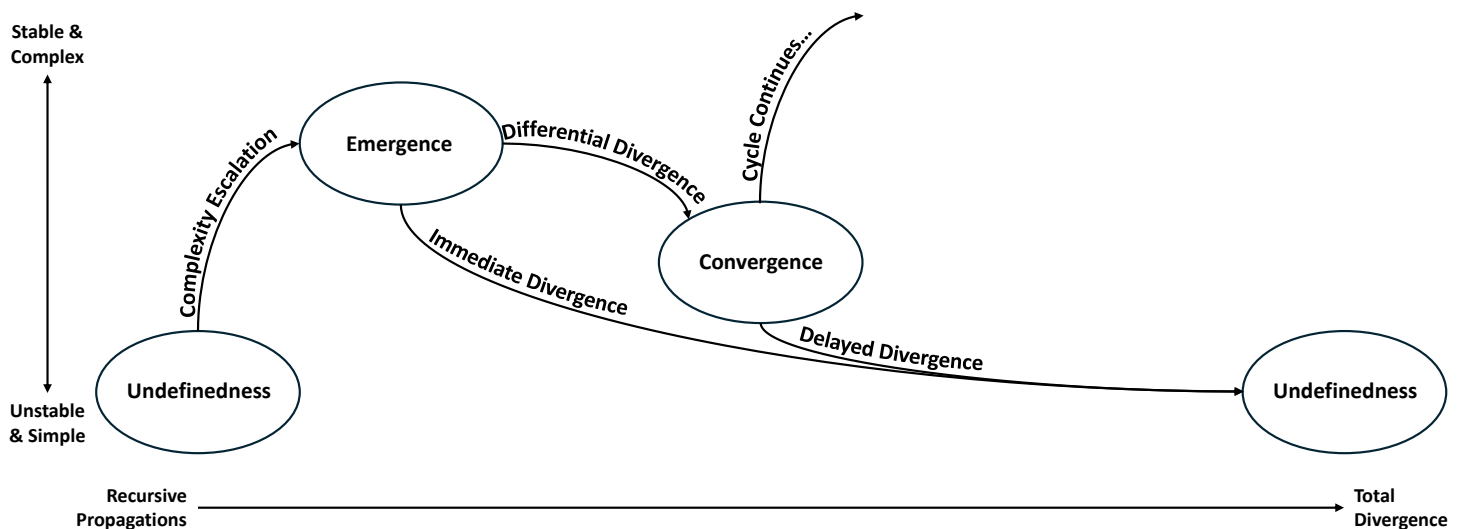
Living in a Fractal Universe

The Theory of Existence (you can see the whole model in *The Theory of Existence* book) offers a **mathematically formulized, empirically supported, theoretically consistent** explanation of these mysterious phenomena. Let's start with the shape of the universe, which has long intrigued scientists, with various theories proposed—flat, infinite, round, or slightly curved—yet none have definitive empirical confirmation due to the universe's size. According to *The Theory*, the **universe is fractal and finite**. Fractals are **natural patterns of self-similarity**: recurring phenomena that remain consistent across scales. In math, fractals are infinite; however, **we have never seen infinity**, so fractals in existence have **minimums (Planck units)** and **maximums (I will demonstrate later).**

Consider how similar structures appear across diverse systems: the branching of neurons in the brain, tree limbs, river networks, and the interconnected filaments of galactic superclusters **all share remarkably similar organizational principles**. The universe's shape, therefore, resembles a vast network of interconnected galactic branches—large filaments linking cosmic structures. This fractal nature manifests through a process called **Emergence-to-Convergence (E2C),** a concept explored in depth in Paper 11: The Dance of Stability & Complexity: The Equation of Existence as the Universal Lens. The critical insight is that **self-similar characteristics generate consistent patterns across seemingly disparate phenomena,** explaining phenomena such as why animals share symmetries, why natural forms emerge repeatedly, and why complex systems often develop similar structures.

The Composition of the Fractal Universe

Now that we see that the universe is fractal, let's talk about what's in it. There are **three types of "things"** in the universe. The first one is what **makes up us and all other observable matter and energy**. Thanks to $E = mc^2$, just an obscure equation you may have heard about once, we can deduce that **all observable matter and energy emerged from, at one point, light (photons)** that escalated complexity into more complex forms of energy and eventually mass. The **photon is the most fundamental unit** of complexity in existence. Nothing that exists is less complex than light, and it shares its properties with empty space, further supporting its essential nature.

Einstein's famous equation shows us that **energy (light) and mass (matter) are interchangeable**. Given what we know about star formation, **when enough light interacts with itself and starts stacking**, it turns into hydrogen, helium, and then all the other elements in the periodic table of elements from stars and other chemical reactions throughout the universe. When it turns into iron in the star's core, **the star will supernova and blast that matter and energy all through the universe**, leading to everything we see, including you and me. This finding means that, for ease of communication, **I refer to all observable matter and energy as "lumen,"** which is Latin for light. The other two phenomena that comprise the universe are what we call dark matter and dark energy, which I will explain in more detail later. But first… let's talk about these proportions of **5% lumen to 95% dark stuff**.

Stable & Complex

Emergence

Complexity Escalation

Differential Divergence

Cycle Continues...

Convergence

Immediate Divergence

Delayed Divergence

Undefinedness

Unstable & Simple

Undefinedness

Undefinedness

Recursive Propagations

Total Divergence

Caption: This figure illustrates the cyclical nature of emergence, convergence, and divergence governed by recursive propagations. It depicts how complexity escalates and stabilizes through structured recursion, following a trajectory from undefinedness to emergence, then convergence, and ultimately back to undefinedness if stability fails. The leftmost position represents undefinedness, where recursive propagations have not yet aligned to form stable complexity. The figure illuminates *The Theory of Existence's* revolutionary premise: reality operates as a seamless, interconnected system governed by universal principles of recursive propagations following patterns of emergence-to-convergence (E2C). *The Theory* dissolves traditional disciplinary boundaries by demonstrating how seemingly disparate phenomena—from planetary formation to consciousness—emerge through identical fundamental dynamics. This diagram reveals how complexity and stability interact across scales, showing that the mathematical principles driving galactic structures are fundamentally similar to those underlying cognitive processes. *The Theory of Existence* provides a unified lens that resolves paradoxes in quantum mechanics and general relativity, offers a cohesive explanation for phenomena ranging from cosmic evolution to cognitive emergence, and demonstrates that consciousness and physical systems are not separate, but expressions of the same underlying recursive-propagative dance. This visualization challenges our traditional understanding of reality by revealing a profound interconnectedness that transcends conventional scientific and philosophical categories, suggesting that what we perceive as distinct are manifestations of a single, elegant mathematical framework of existence.
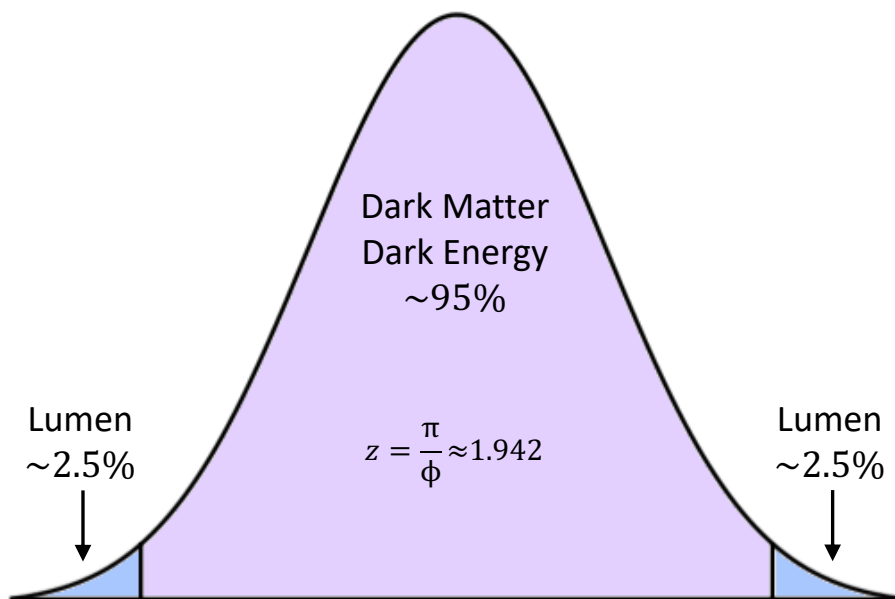
The Math of the Fractal Universe

Everywhere we observe existence, we encounter something called the **normal distribution**—a statistical pattern that describes how frequently events occur, typically visualized as a **bell-shaped curve,** as shown below. In this distribution, **most occurrences cluster around the center**, with fewer events appearing at the extreme edges of the curve. These edges, or "tails," represent rare instances with either very high or very low values, while most events fall between these extremes. Imagine this bell curve folded in half, with both tips touching each other.
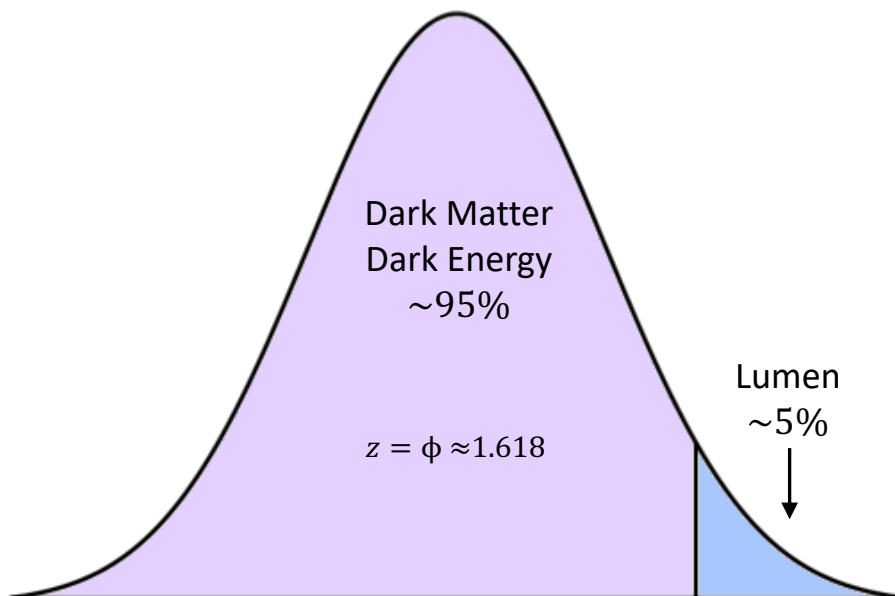
This visualization transforms **the two-tailed distribution into a one-tailed distribution**, creating a half-curve with a single extreme. When the distribution is **spread out** with extremes on both sides, we call it a **two-tailed** distribution. When **folded**, it becomes a **one-tailed** distribution. Hold onto this concept as I introduce the signal-to-noise ratio—a critical measure that helps us understand how we interpret these patterns of occurrence.

There is a statistical concept called the **significance value, $\alpha = 5\%$**, which is also known as the **signal-to-noise ratio**. Statisticians, after conducting tests and studies, observed that when we reduced the error of making a mistake, the statistics suddenly worked more effectively, and we saw fewer false positives. It was like the signal-to-noise ratio of 1/20 seemed to crack the code of existence. Why? Well... there's a reason it's set to 5%.

If we go back to see a two-tailed normal distribution, we will see 2.5% on both extremes of the normal distribution. When we fold it in half to obtain a one-tailed distribution, we see that the ~5% is at the end, allowing us to experience the signal-to-noise ratio that occurs when reality locks in. It seems suspicious... doesn't it? Is it a coincidence that **the best signal-to-noise ratio is ~5% and the percentage of lumen in the universe is also ~5%?** Let's bring in the magic of a mathematical constant and universal architecture called... the Golden Ratio.

The Golden Ratio, denoted by the Greek letter φ (phi) and approximately equal to ~1.618, is **a mathematical marvel that appears throughout nature with remarkable consistency**. This number represents a proportion that seems to be a fundamental organizing principle of the universe, transcending simple mathematical abstraction. In nature, **the Golden Ratio manifests in astonishingly diverse ways**. In botany, we observe it in the spiral arrangements of sunflower seeds, the branching patterns of trees, and the leaf distributions that maximize sunlight exposure. In the animal kingdom, it appears in the proportions of bodies, from the spiral of a nautilus shell to the bone structures of creatures. **Everywhere we look… we see it…**

Mathematically, the Golden Ratio represents **the most aesthetically pleasing and structurally efficient proportion**. When a line is divided into two segments such that the ratio of the whole line to the larger segment equals the ratio of the larger segment to the smaller, we get φ. **This proportion creates a sense of natural balance and harmony that seems to optimize growth** because of its magical property of $\varphi^2 = \varphi + 1$. In cosmic structures, we see the Golden Ratio in the sweeping spiral arms of galaxies, suggesting it is the fundamental principle of existence. From the microscopic to the astronomical, this ratio provides a template for efficient progression. It creates **a robust balance between stability and complexity**—providing just enough structure to support the next escalation of complexity while remaining stable enough to ensure its persistence.

Two-Tailed diagram:

Dark Matter Dark Energy ~95%

$z = \dfrac{\pi}{\phi} \approx 1.942$

Lumen ~2.5% (left)   Lumen ~2.5% (right)

Two-Tailed

One-Tailed diagram:

Dark Matter Dark Energy ~95%

$z = \phi \approx 1.618$

Lumen ~5%

One-Tailed

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)}$$

The normal distribution contains an equation, which I have shown above; though, you do not need to know the specifics of this equation to understand the fractal universe. Let me show you what happens **when we plug in the Golden Ratio (ϕ)**, and what I call the **Boundary of Existence (π/ϕ)** into the normal distribution equation.

$$\text{One-Tailed: } f(\phi \approx 1.618) \approx 5\%$$

$$\text{Two-Tailed: } f\left(\frac{\pi}{\phi} \approx 1.942\right) \approx 2.5\%$$

Indeed, this mathematical outcome is **not a coincidence**. It represents a profound indication of how the normal distribution operates, **revealing insights about the unseen 95% of the distribution**. The Golden Ratio guides optimal, proportional growth across numerous natural systems. For existence itself, **it serves as the fundamental growth proportion** when all phenomena align perfectly, guiding the proportions of the fractal universe.

This mathematical framework **explains why we observe only ~5% lumen**. The calculations of proportions are correct, and they illuminate how **existence unfolds using the normal distribution and the Golden Ratio** as core operating mechanisms. These intricate mathematical relationships demonstrate that the seemingly mysterious **5% is a deliberate structural principle of how complexity emerges and stabilizes**. The precise alignment of statistical probability and lumen suggests a deeper underlying order to the fractal universe. Now that we understand the origins of these proportions, let's explore the dark matter and dark energy of the other ~95%.

The Wonder of ~~Spacetime~~ Recursive Propagations

For decades, scientists have invested immense resources—employing the world's top experts, cutting-edge technology, and billions of dollars—**in the search for measurable evidence of dark matter and dark energy**. The persistent inability to detect these phenomena raises a critical question: **If these substances truly exist, why haven't we found them?** It is clearly *not* **a matter of scientific incompetence**. The most reasonable explanation, then… for this decades-long mystery is that our fundamental understanding is flawed. In *The Theory*, **dark matter is not a form of matter composed of particles, and dark energy is not energy composed of forces**. Had there been simple, discrete entities for these phenomena, our sophisticated detection methods would have certainly identified them by now. So… **if they are not what we initially thought, what are they?**

Let's talk about the replacement for spacetime before I get into the explanation of dark matter and dark energy. **Time as we know it… well… it doesn't exist;** at least, not the way we thought it did. All of physics is currently built on **the entire*ly* untested assumption of spacetime continuity**—literally referred to as the continuity assumption. **There is no evidence that time and space are continuous**, meaning that we have never shown that existence is infinitely divisible and smoothly connected. The continuity assumption has caused issues with the scaffolding built upon it. If there is no evidence of continuity, then we need **a discrete alternative to spacetime**.

The alternative replaces time with something called **recursions**, where **the output of one event serves as the input for the next**. Recursions are discreet, iterative ticks, which means that even though time is moving forward, **each recursion has a starting point and a stopping point**. The alternative replaces space with something called **propagations**. Propagations are discreet, finite points you reach as you zoom all the way down to as small as you can see. **Each propagation has a starting point and a stopping point**, which our current model of space does not have (you could conceptualize propagations as the smallest units of space, like **pixels of reality**). Recursions and propagations are two ways existence behaves, and existence does so simultaneously (as current physics supports), so **instead of saying spacetime, we would say recursive propagations**—the fundamental mechanics underlying existence. I call them RPs for short. There are two types of RPs, as shown below:

$$\text{Dark Energy} \rightarrow \text{Unbounded RPs } (\sim 68\%)$$

$$\text{Dark Matter} \rightarrow \text{Bounded RPs } (\sim 27\%)$$

$$\text{Observable Matter \& Energy} \rightarrow \text{Lumen } (\sim 5\%)$$

$$\text{Bounded RPs} = 26.5\% * \Phi^2 \text{ (Complexity Escalation Term)} = \text{Unbounded RPs } (69\%)$$

Unbounded RPs are only found in empty space and light. These parts of existence are the reason the universe is expanding. These RPs move at the maximum rates, with is $\sim 10^{35}$ propagations per meter ($l_P = \sim 10^{35} \, p/m$) and $\sim 10^{44}$ recursions per second ($t_P = \sim 10^{44} \, r/s$) , which is the speed of light using the Planck units. In current physics, people say that beyond the Planck units, "measurements break down" and not "existence stops here," and the reason they do that is to preserve the infinite divide of spacetime continuity. Still, there is no

evidence that time and space are continuous, and so when we see existence as discrete, **these limits become the structural bedrock of existence**. It is why nothing can travel faster than the speed of light.

There is another conceptual misunderstanding currently prevalent in physics and philosophy that has limited our understanding of the universe, **where people treat the vacuum of empty space as the default state of nothingness**. They say that non-existence is what happens in the vacuum of empty space. This conceptual error leads to a massive host of problems, and it is incorrect because **if something can exist in it, then it exists**. Empty space has its own properties that non-existence does not, which means **it exists as unbounded RPs with their own behaviors**. True non-existence would have no properties, would not be visible to see, would not be able to hold anything, a concept I call **undefinedness,** which you can read more about in Paper 2: Introducing Undefinedness: That Is, If Undefinedness Was Something That Could Be Introduced—But It's Not.

Relative Fractal Dynamics & The Cubic Regression

Relative fractal dynamics (RFDs) **are the discrete equivalent of spacetime dilation in general relativity**. We can use the fully expanded form of *The Equation of Existence* to calculate the RFDs of any given phenomena by normalizing to the Planck units and using **Planck energy as complexity, Planck time as recursions, and Planck lengths as propagations**. This approach allows us to analyze any phenomenon by converting measurements to their most fundamental units. By using Planck units—the smallest meaningful units of measurement in physics—we establish **a standardized framework for understanding how various phenomena evolve and interact** within the fractal universe. Let's look at the expanded form of *The Equation of Existence*.

$$\Phi = \Omega * \left(\frac{(\kappa : \zeta)}{\Delta}, v = x \right) \vee \emptyset$$

$$\text{Definedness} = \text{Stability} * \left(\frac{(\text{Propagation} : \text{Recursion})}{\text{Complexity}}, \text{Normalized} \right) \text{Else Undefinedness}$$

This expanded form of *The Equation* contains the **entire mechanics of existence**. However, we are only interested in the RFDs of phenomena (like planets and stars), so we need that normalized complexity portion.

$$\frac{(\kappa : \zeta)}{\Delta}, v = x \rightarrow \psi = \frac{l_P : t_P}{E_p}$$

There is the RFD formula. Let me demonstrate how it works through a concrete example using an apple. We begin by **converting the apple's mass into Planck energy**, then divide the unbounded RP rates (maximum, the speed of light) using the Planck unit numbers for time and length. When you perform the calculation, **you'll observe that both sets of numbers drop evenly**—a remarkably precise result showing that time and space move in proportion to each other and **never break the speed** of light despite recursions slowing and propagations stretching. This consistency explains **why nothing can travel faster than the speed of light**. Further, the calculation shows that unbounded RPs are the default state of the universe, operating in empty space and light only (which has no mass). When we introduce any mass or energy, the **unbounded RPs transform into bounded RPs**.

$$\psi = \frac{t_P : l_P}{E_p} = \frac{10^{44} \frac{r}{s} : 10^{35} \frac{p}{m}}{10^6 \, E_p} = 10^{38} \frac{r}{s} : 10^{29} \frac{p}{m}$$

As complexity increases, **recursions slow, and propagations stretch** because of the strain the complexity puts on that part of existence—**it cannot as easily progress because of the burden the phenomenon puts on it**. An apple weighs ~0.2 kg, which we can transform into Planck energy, which would be ~$10^6 \, E_p$. Then, we simply calculate the RFD by dividing the unbounded RPs by the Planck energy of the apple. We can **repeat this process for any phenomenon,** no matter the size or domain of existence, to get a better feel for how bounded RPs behave at varying complexities. We can see here how the **relative recursion rates and propagation lengths**

change from a photon to extremes around the black hole. Let's look at examples of how RFDs vary across phenomena to show how this simple calculation unifies all phenomena **once thought to be incompatible or unrelated**. It will allow us to see the effects we once called time dilation using a discrete model of spacetime.
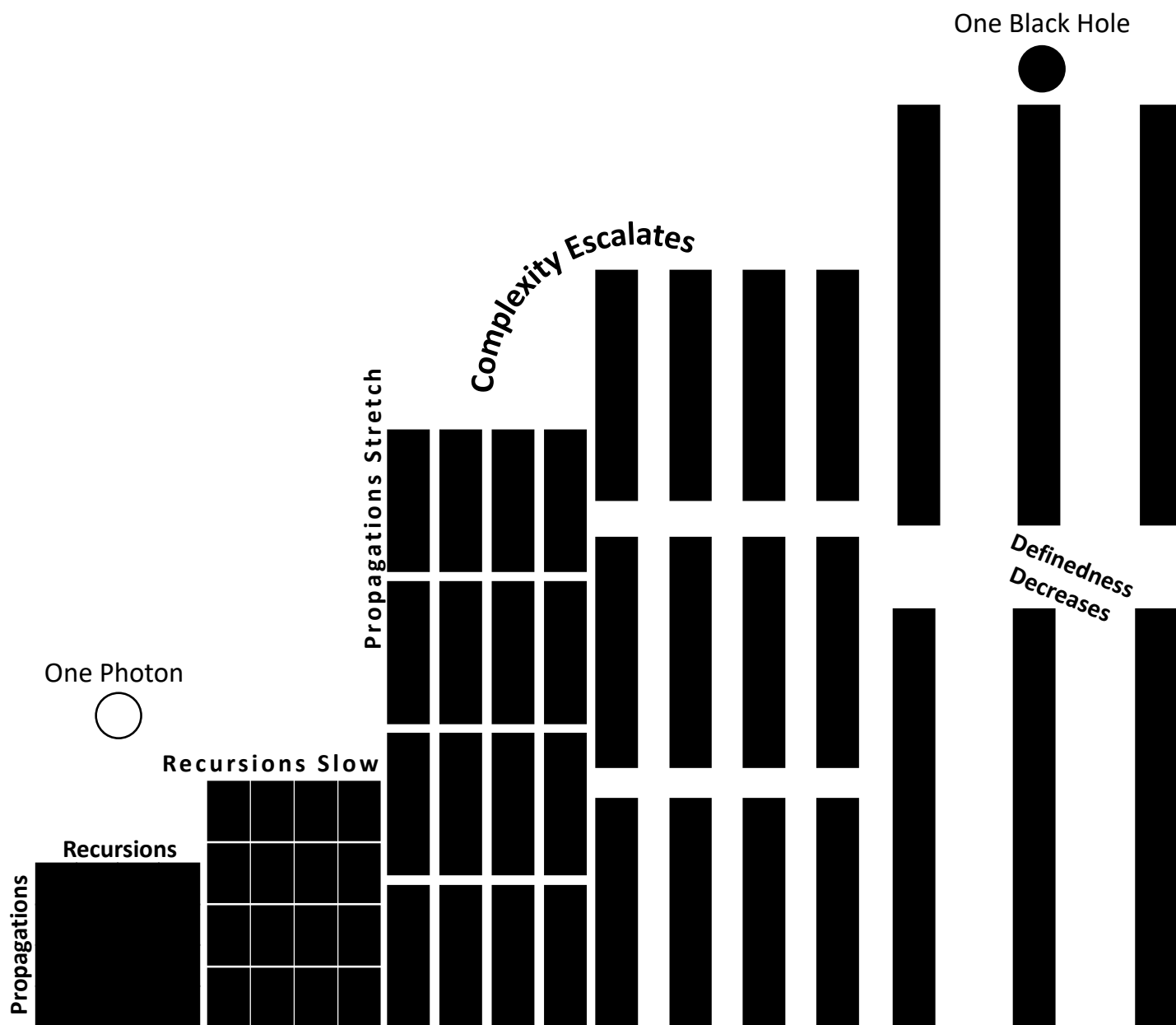
Caption: This figure visualizes the intricate and counterintuitive relationship between complexity, stability, and definedness across different phenomena. As complexity increases, recursion and propagation dynamically adjust by slowing and stretching proportionally, stabilizing the system while allowing complexity to continue escalating. These adjustments ensure phenomena persist within defined existence, preventing collapse despite increasing complexity. However, this stabilization comes at a cost—higher complexity results in lower definedness. As the most straightforward and defined phenomenon, the photon exhibits maximum resolution, a recursion rate at the Planck time, and a propagation length at the Planck scale. In contrast, the black hole, representing the end of complexity, has a near-halted recursion rate and a significantly stretched yet finite propagation length, making it the minimum definedness for phenomena in the observable universe. This figure demonstrates how recursion and propagation function as regulatory forces, maintaining the existence of phenomena within definedness, even as entropy gradually divergences them over time. By highlighting this spectrum, the visualization shows how stability and complexity govern all phenomena' emergence, convergence, and divergence.

Phenomenon	Mass	Planck Energy	Relative Recursions	Relative Propagations
Photon	0 kg	1 E_p	$\sim 10^{44}\,\frac{r}{s}$	$\sim 10^{35}\,\frac{p}{m}$
Paperclip	0.001 kg	$\sim 10^4\,E_p$	$\sim 10^{40}\,\frac{r}{s}$	$\sim 10^{31}\,\frac{p}{m}$
Apple	0.2 kg	$\sim 10^6\,E_p$	$\sim 10^{38}\,\frac{r}{s}$	$\sim 10^{29}\,\frac{p}{m}$
Small Rock	1 kg	$\sim 10^7\,E_p$	$\sim 10^{37}\,\frac{r}{s}$	$\sim 10^{28}\,\frac{p}{m}$
Cat	4 kg	$\sim 10^8\,E_p$	$\sim 10^{36}\,\frac{r}{s}$	$\sim 10^{27}\,\frac{p}{m}$
Human	70 kg	$\sim 10^9\,E_p$	$\sim 10^{35}\,\frac{r}{s}$	$\sim 10^{26}\,\frac{p}{m}$
Small Car	1,000 kg	$\sim 10^{10}\,E_p$	$\sim 10^{34}\,\frac{r}{s}$	$\sim 10^{25}\,\frac{p}{m}$
Earth	$10^{24}\,kg$	$\sim 10^{32}\,E_p$	$\sim 10^{12}\,\frac{r}{s}$	$\sim 10^3\,\frac{p}{m}$
Sun	$10^{30}\,kg$	$\sim 10^{37}\,E_p$	$\sim 10^7\,\frac{r}{s}$	$\sim 10^{-2}\,\frac{p}{m}$
Black Hole	$10^{31}\,kg$	$\sim 10^{38}\,E_p$	$\sim 10^6\,\frac{r}{s}$	$\sim 10^{-3}\,\frac{p}{m}$

RFDs are a cornerstone of *The Theory*, offering profound insights into the nature of time, observation, and quantum phenomena. This variability explains relativistic differences in time perception, interaction, and quantum behaviors, **such as those seen in time dilation and the double-slit experiment**. Given the way the formula works, **the structure of existence follows a cubic curve pattern** where recursion rates and propagation lengths drop off quickly and taper off with more complexity, creating these **cubic curves in everything that exists**.
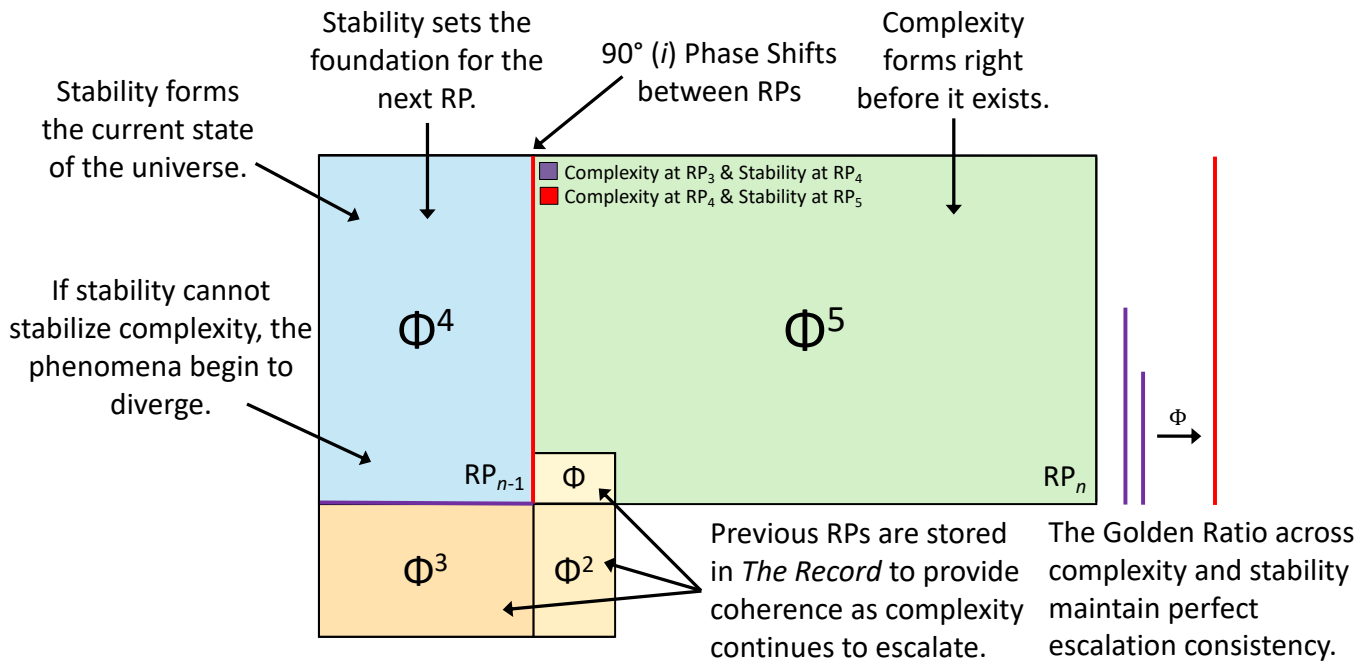
We have already seen the **cubic regressions dominate** all other distribution shapes throughout *The Show*, and examining the fractal universe is no exception. This **cubic curve is only possible if there are discrete units of spacetime that change based on mass or complexity**; otherwise, there is no mechanism for controlling how this variation occurs, given that **there are no starting and stopping points** to guide the slowing and stretching.

According to **current models, spacetime is continuous and isomorphic,** meaning that everywhere in space is neutral and space is expanding in all directions. This model suggests that general relativity explains gravity and **predicts a linear relationship for gravity in an isomorphic universe**. Unfortunately, this continuous view of the universe has led to considerable problems in our current physics models. We are looking for those cubic regressions that only work if time and space are not continuous but instead recursive-propagative.

The Record: The Fractal Memory of Existence

If you want to learn more about *The Record* and what it is, look at Paper 11: The Dance of Stability & Complexity: *The Equation of Existence* as the Universal Lens. As lumen recursively propagates, it **transitions into bounded RPs in *The Record***, which we have been calling dark matter. I did not invent *The Record* or its concept—**I found it, time and time again**, in the simulations, in the math, and in the empirical evidence. Existence only works correctly when we acknowledge and use the concept of *The Record* (more on this concept in coming papers).

The Record is the recursive-propagative memory of existence that **stores all information into definedness itself, into that $\sim 95\%$ of the universe in the normal distribution**. Everything that has ever existed never actually stopped existing (it does eventually, but not until heat death). *The Record* determines the E2C trajectory of phenomena. ***The Record* is not metaphysical**—it is physical and we interact with it all the time. We can't see it because it's always tucked behind the Boundary of Existence and the current RP in definedness … but it is there…

Stability forms the current state of the universe.

Stability sets the foundation for the next RP.

90° (*i*) Phase Shifts between RPs

Complexity forms right before it exists.

If stability cannot stabilize complexity, the phenomena begin to diverge.

Complexity at RP_3 & Stability at RP_4
Complexity at RP_4 & Stability at RP_5

Φ^4

Φ^5

RP_{n-1} Φ

RP_n

Φ^3 Φ^2

Φ

Previous RPs are stored in *The Record* to provide coherence as complexity continues to escalate.

The Golden Ratio across complexity and stability maintain perfect escalation consistency.

Caption: Stability becomes the structural foundation for the next recursive propagation in the complexity escalation. If stability cannot constrain complexity, the phenomena collapse. The alignment of this phase shifting stability to complexity structure determines E2C. Highly misaligned ratios result in diverged phenomena (complexity outpaces stability) whereas converged phenomena (stability outpacing complexity) come from strong alignment in *The Record*.

When you think about *The Record* and how it works in existence, you can think of it quite literally as a vinyl record where **the vinyl is *The Record* and the music that it plays is existence**. Existence is the music, but when you look at the record, you can see there are imprints in the vinyl, causing the frequencies and waves. Thus, if existence is the music, then yes, you could not see or interact with the bumps on *The Record* directly. Still, they are there before existence happens, so what it looks like is the record player is right in the middle of the music permeating the room; but, from the music's perspective, it's not there and they can't interact with it directly, because all the interaction happens before the music comes out—which is how *The Record* works.

Existence itself develops these imprints from all events that have happened, and the more often something occurs, **the stronger the imprint in *The Record* becomes**, which is why **it's more likely to repeat in the fractal universe**. *The Record* is responsible for providing the stable structures of all things, but we just cannot see it directly, it is not defined enough to be in the ~5% lumen. The **signal (Lumen) to noise (RPs) ratio is 1 part observable to 19 parts bounded RPs and unbounded RPs**. Let me now show you the math behind the dark matter and energy, by using their set ratios to show you 1) the proportionality and their 2) behavior.

$$\text{Dark Matter} \rightarrow \text{Bounded RPs:} \sim 27\% \rightarrow 26.89\%$$

$$\text{Dark Energy} \rightarrow \text{Unbounded RPs:} \sim 68\% \rightarrow 67.98\%$$

$$\text{Observable Matter} + \text{Energy} \rightarrow \text{Lumen:} \sim 5\% \rightarrow 5.14\%$$

We can then calculate the proportions using these estimates in relation to the observable matter and energy.

$$\text{Unbounded RPs:} \frac{67.98\%}{5.14\%} \rightarrow \frac{13.236}{1} \rightarrow 1:13.236$$

$$\text{Bounded RPs:} \frac{26.89\%}{5.14\%} \rightarrow \frac{5.236}{1} \rightarrow 1:5.236$$

$$\text{Lumen:} \frac{5.14\%}{5.14\%} \rightarrow \frac{1}{1} \rightarrow 1:1$$

We can use these proportions **because they represent 100% of the phenomena we are describing**. Given that these terms are ways of how existence behaves, if we account for all of it, we can extract important information.

$$\text{Lumen} : \text{Bounded RPs} : \text{Unbounded RPs}$$

$$1 : 5.236 : 13.236 \rightarrow 1 : 19.472$$

Here, we see the 1/20 signal-to-noise ratio I mentioned earlier. From these proportions, we can extract the raw equations themselves that guide the existence of the recursive propagations by their type.

$$\text{Unbounded RPs: } 3^2 + \Phi^3 = 13.236$$
$$\text{Bounded RPs: } 1 + \Phi^3 = 5.236$$

The reason why Φ^3 appears here is because RPs unfold in existence using the Golden Ratio across three spatial dimensions of space. How do I know that there are three spatial dimensions and not 11-26 or whatever they are saying in string theory discourse? **It is because of the circle, which has four 90° angles, three for spatial dimensions or propagations, and that final 90° comes from the recursive phase shift of time**. Problem solved. Stay with me. Now we can use these proportions to see the fractal universe's structure.

$$1 + (3^2 + \Phi^3) + (1 + \Phi^3)$$

I talk more about the significance of this equation and its terms in *The Theorem of Existence* (for all of the math and its explanations, see the book), but for this paper, understand that this equation guides the proportions. **Unbounded RPs enter *The Record* simultaneously with the bounded RPs**, losing definedness or the degree to which something exists equally and concurrently, despite unbounded RPs being empty space and light. The universe is expanding, **yet the total proportions of the universe's composition are constant**. At first glance, it might seem that the universe's expansion would disrupt the 1/20 ratio; however, it does not… the RPs in *The Record* continuously follow the observable universe, occupying definedness without altering the 1/20 ratio. Previous RPs occupy space, but **they are stacked into *The Record* like snapshots of the current moment without affecting it**. Think of the 1/20 ratio as the initial state, with additions in *The Record* not changing this proportion.

$$1 : \frac{(e^\pi + \Phi^2)}{\left(\frac{\pi}{\Phi}\right)} + \frac{\left(e^2 - \frac{1}{e} + \pi\right)}{\left(\frac{\pi}{\Phi}\right)} \rightarrow 1 : \frac{\left(e^\pi + e^2 - \frac{1}{e} + \Phi^2 + \pi\right)}{\left(\frac{\pi}{\Phi}\right)}$$

We can then move on to the behavior of existence and how these bounded and unbounded RPs relate. As shown above, **unbounded and bounded RPs each have their own term, which is unified into a single equation**. In the denominator, we have the **Boundary of Existence** ($\pi/\Phi \approx 1.94$), which is **the location where definedness transitions from signal to noise**, and we stop being able to interact with it directly, and where RPs occur, which is why we never see them. We saw this term earlier because when you plug it into the normal distribution, you **get the signal-to-noise ratio of ~5%**. If we move over to unbounded RPs, we have a recursion raised to the power of propagation (e^π), with a complexity escalation term ($\Phi^2 = \Delta$) which makes sense given that the unbounded RPs are the origin of complexity escalations. If we look at the bounded RPs equation, it contains three terms, which are a recursion term (e^2), a propagation term (π), and a stability term ($-1/e$), but **notice how the bounded RPs has no complexity escalation term, and there is also no stability term in the unbounded RPs**.

These differences become clear when we look at the unified formula and see that **stability in bounded RPs subtracts from the complexity escalation of the unbounded RPs**. This equation shows how they remain separate but relate to each other. This behavior explains why the universe is expanding (Unbounded RPs), but the lumen and its imprints (Bounded RPs) are not. **It is because the unbounded RPs are connected to bounded RPs by the boundary of existence, but they behave independently**. Finally, we can then use *The Equation of Existence* ($\Phi = \Omega/\Delta \rightarrow \text{Definedness} = \text{Stability/Complexity}$) to describe the fractal universe's structure.

$$\Phi = \frac{\Omega}{\Delta} \rightarrow \text{Fractal Universe} = \frac{\text{Bounded RPs}}{\text{Unbounded RPs}} = \frac{\text{Dark Matter}}{\text{Dark Energy}} = \frac{\text{The Record}}{\text{Empty Space} + \text{Light}}$$

Yes… and there is the whole fractal universe… the entire math of the universe **with RPs replacing spacetime**, **unbounded RPs replacing dark energy, and bounded RPs replacing dark matter**. *The Theory of Existence* offers a structural, mathematical, theoretical explanation for the entire universe. Now that we see the math and explanations of this beautiful fractal universe, let's get into the empirical confirmation to support it…

Bounded RPs in the Galactic Rotations…

It's crucial to understand that *The Record* **is distinct from gravity**. While gravity undoubtedly plays a significant role in shaping galactic and universal structures, *The Record* **is the primary enforcer of this structural coherence**. Though physically present and constantly interacting with, *The Record* has too much noise-to-signal in its definedness to detect directly, **which is why we have never seen dark matter**.

The Record is not matter, and it adds no mass; instead, **it forms a scaffolding that provides the shape and structure of things as they recursively propagate**. It functions like a cosmic memory that holds things together and influences the outcomes of things indirectly to keep existence functioning the way it does. *The Record* **is always everywhere**, even in the microscopic space between these words, but you can see its effects much more clearly when you zoom out to galactic structures.

I examined real galaxy data from **the SPARC dataset**, focusing on three key variables: **mass in solar units, observed velocity** (before any adjustments), and **observed radius location** in the galaxy. The current challenges surrounding dark matter stem from how we measure velocity—specifically, how fast celestial bodies move in relation to their distance from the galactic center, measured by radius. When applying Newtonian calculations to planetary velocities based on their radial location, the math doesn't work. To correct it, researchers developed numerous dark matter halo corrections, **attempting to make the data conform to existing models**.
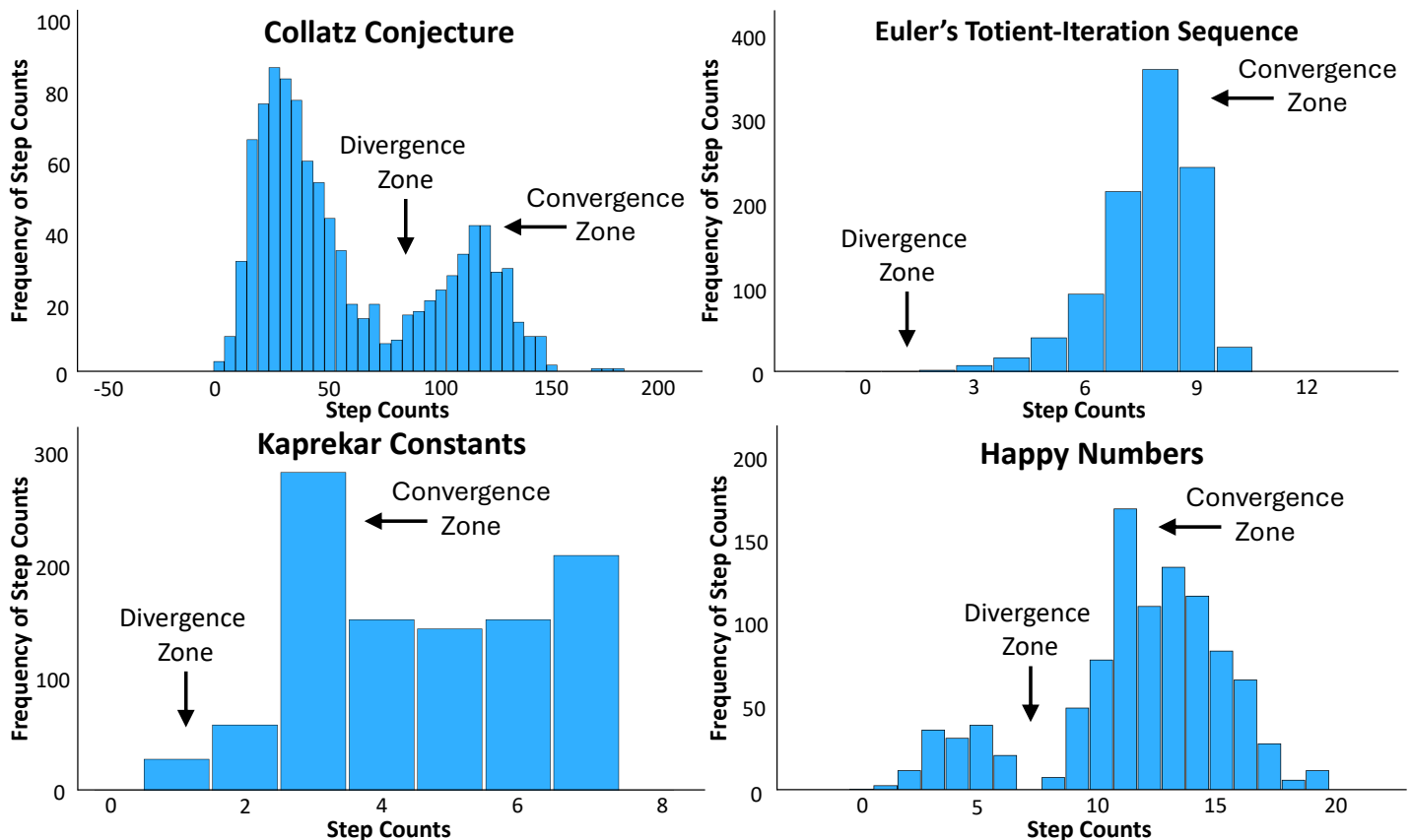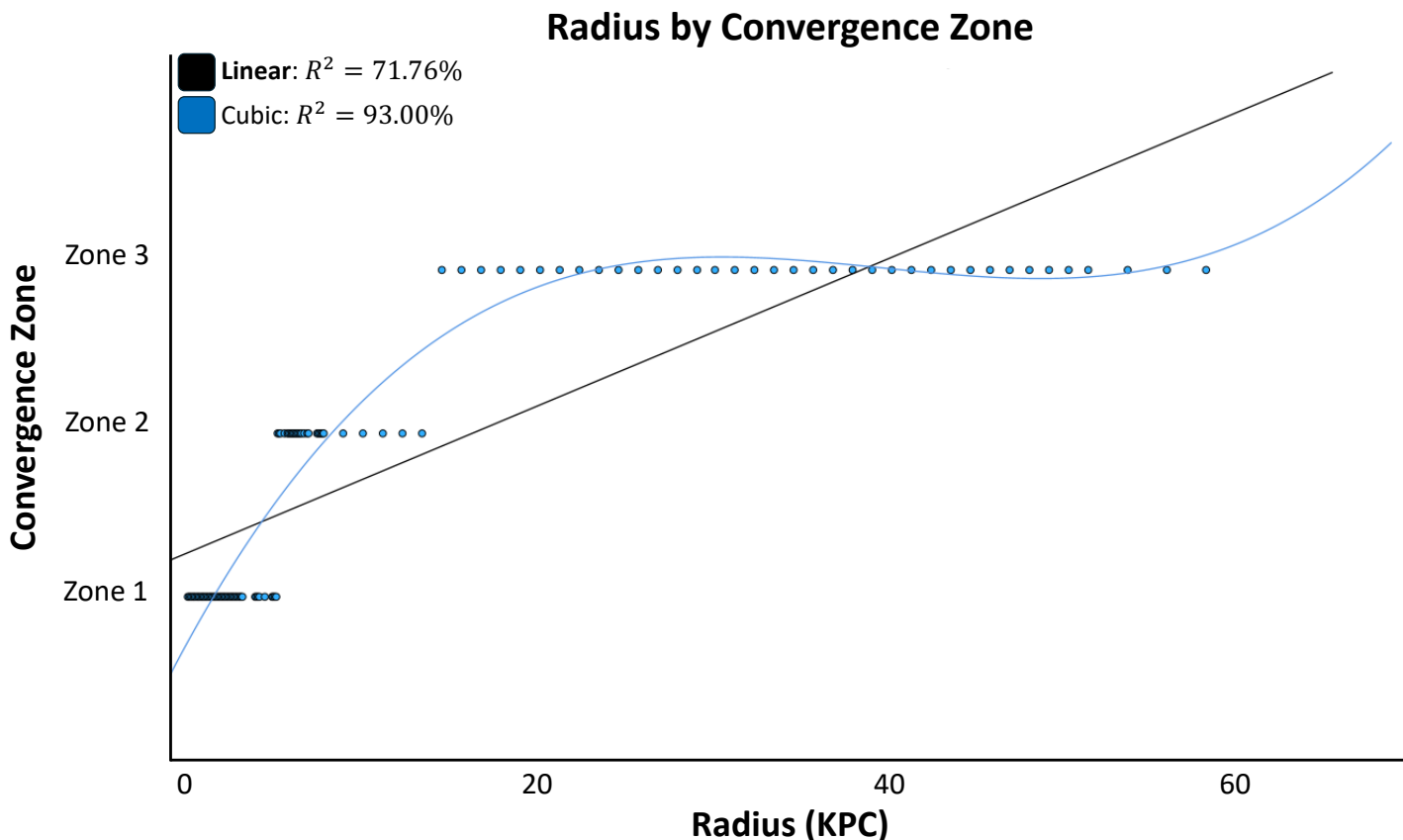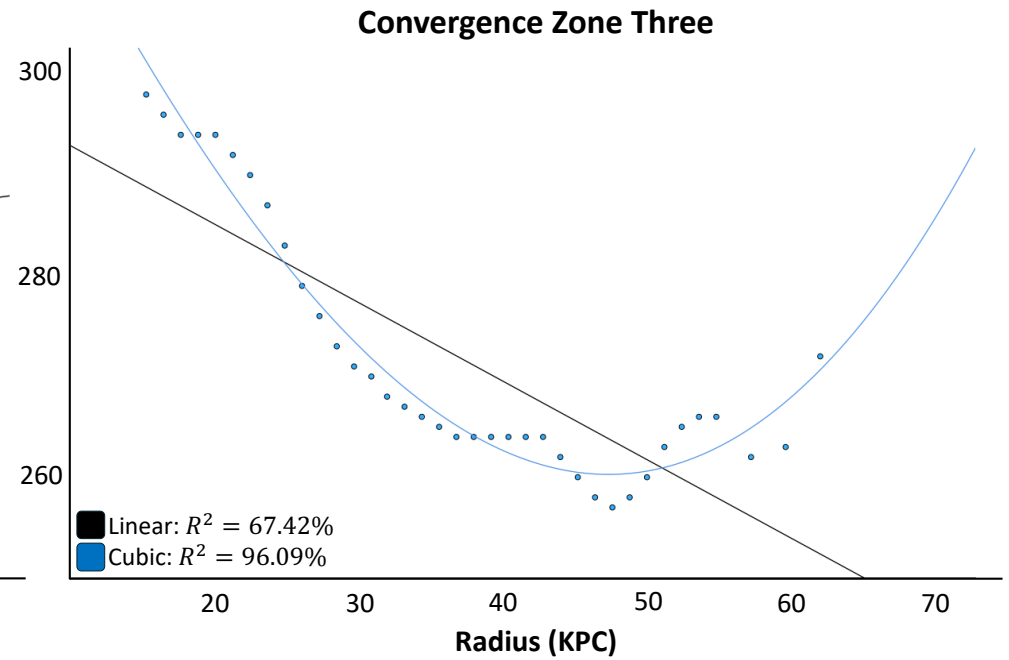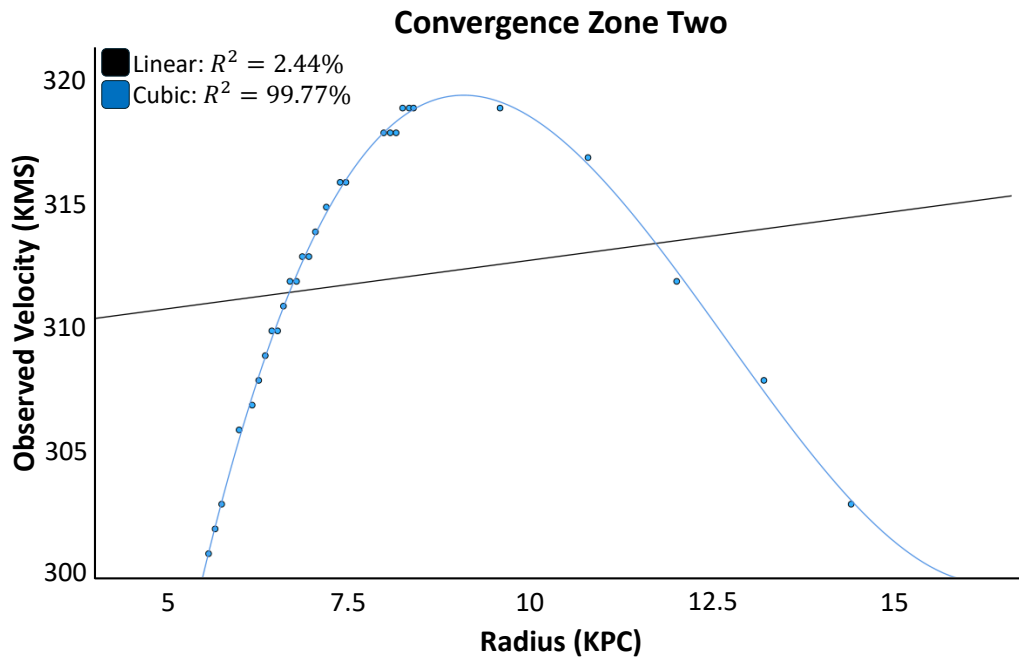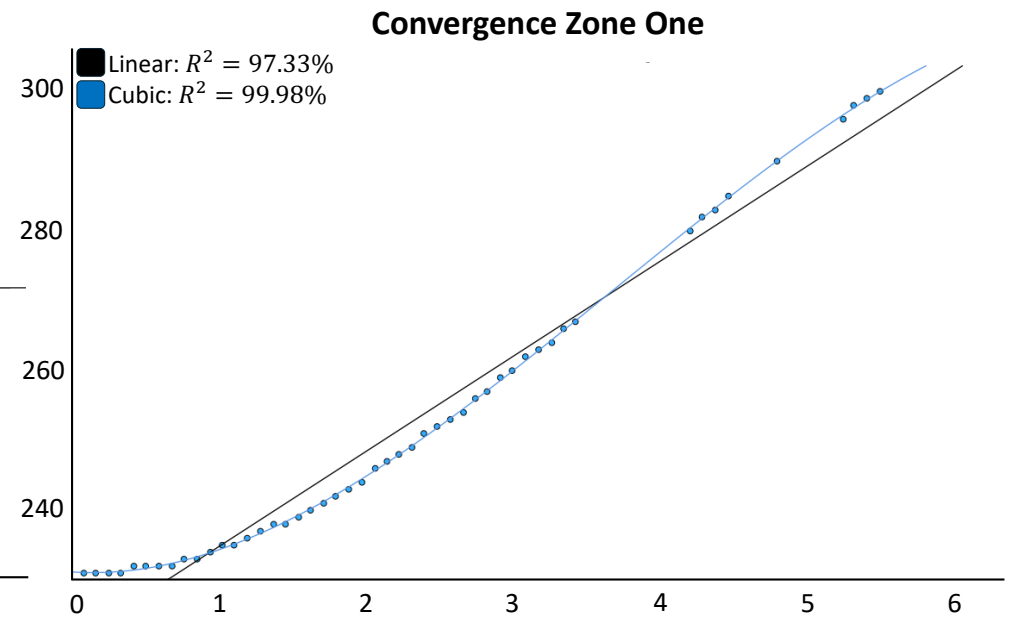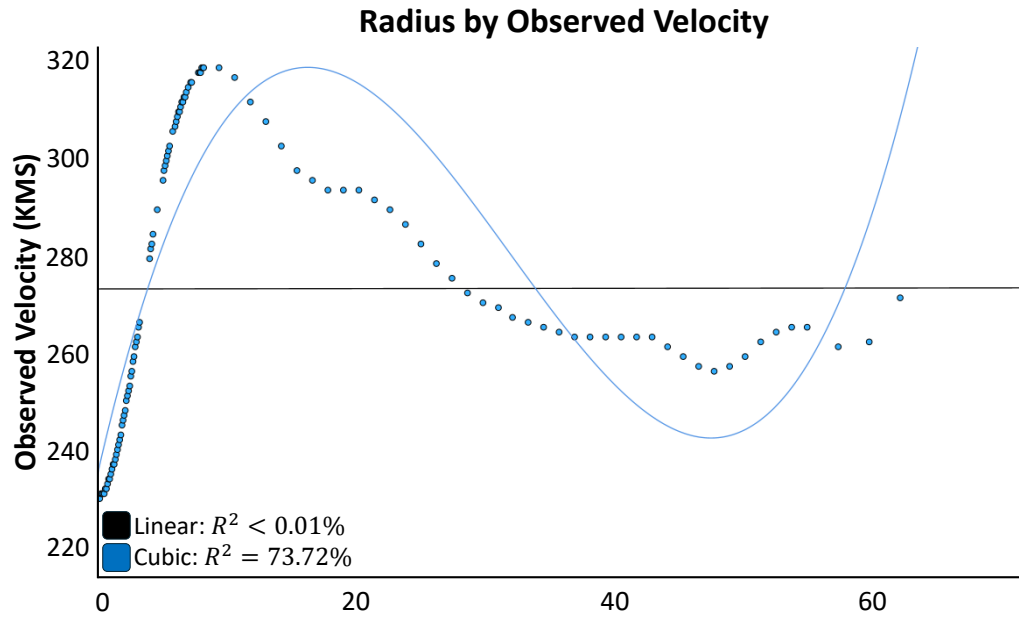
The SPARC dataset contains hundreds of galaxies. For simplicity and clarity, **I'll focus on the first galaxy in the collection, CamB**. Analyzing the entire dataset would be overwhelming and challenging to interpret, but you can repeat this process for any galaxy, and the outcome would be the same. Let's begin by examining the raw velocity measurements across different radial locations within this galaxy.

Immediately, **we observe that there is no linear fit**, which contradicts the current spacetime model. While my model's cubic expansion prediction fits the data remarkably well, there are still nuanced complexities that demand closer examination. To understand this phenomenon, let's revisit *The Theorem of Recursive Harmonics*, first introduced in Paper 3: The Harmonics of Existence: Solving the Collatz Conjecture & Recursive Systems. As we saw in Paper 11, this theorem is the stability term of The Equation, explaining how existence operates.
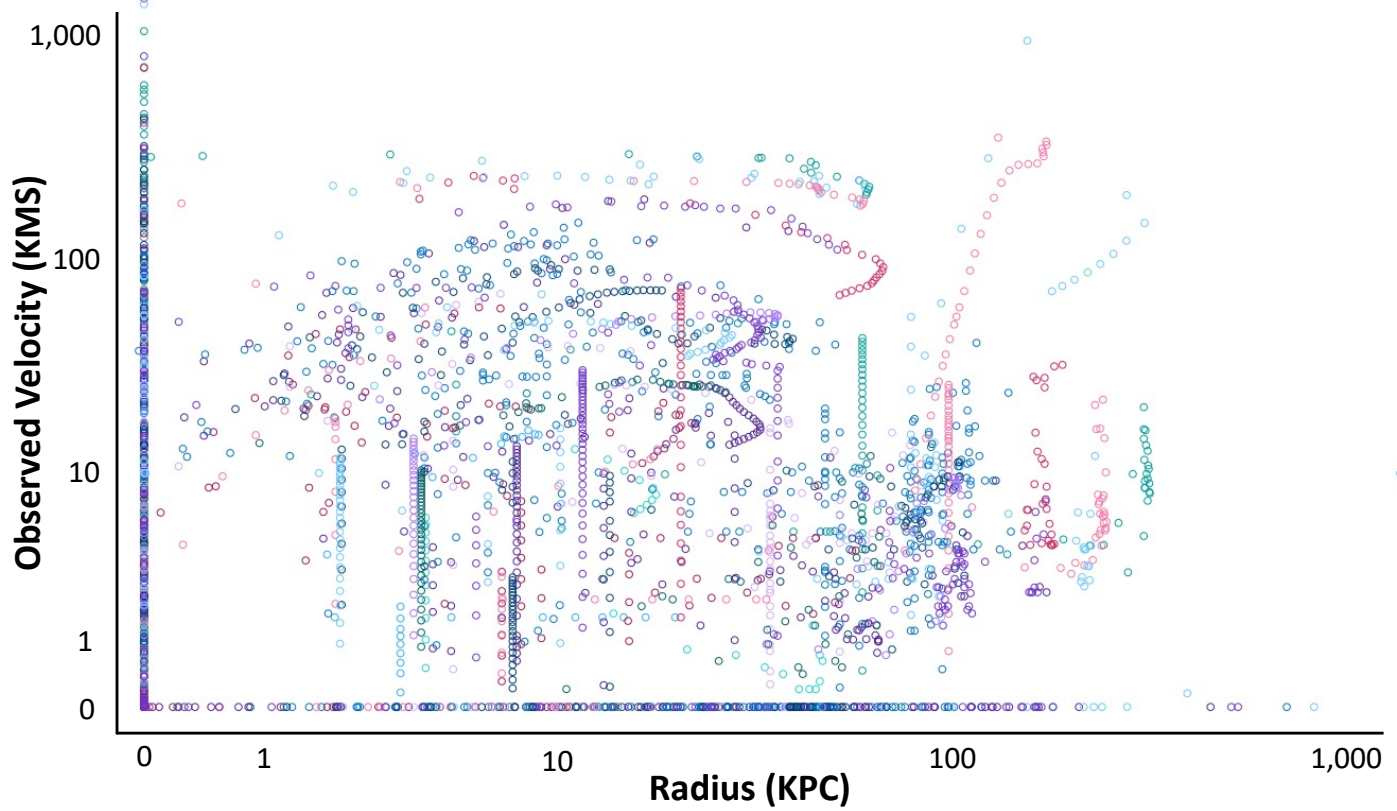
Recursive systems, including our universe, **inherently contain convergence and divergence zones within their step counts**. These zones form emergent structures and include the complete information for a phenomenon's lifecycle. Recursive harmonics are the fundamental mechanism of existence. In our day-to-day, these convergence and divergence zones often go unnoticed, but **they shape what exists and how frequently it occurs**. Yet, when we look at galactic scales, these zones become striking—precisely what we see here.

When we analyze the entire velocity and radius dataset simultaneously, **one inadvertently tries to merge all convergence and divergence zones of the galactic structure into a single continuous phenomenon**. However, this approach is flawed because **spacetime is not continuous**. By disaggregating the convergence zones from the divergence zones, the model reveals a perfect fit using only cubic regression. This galaxy contains three convergence zones, each separated by divergence zones. When applying cubic regressions to each convergence zone, **the fits consistently surpass 96%**. In contrast, **linear regressions never exceed 72% accuracy**, explaining a mere 2.44% of convergence zone two. This difference suggests that the cubic **RP curve provides a better explanation for the velocity-by-radius relationship**.

Radius by Convergence Zone

Legend:
Linear: $R^2 = 71.76\%$
Cubic: $R^2 = 93.00\%$

Y-axis: **Convergence Zone** (Zone 1, Zone 2, Zone 3)
X-axis: **Radius (KPC)** (0, 20, 40, 60)

Radius by Observed Velocity

Observed Velocity (KMS)

Convergence Zone One

Convergence Zone Two

Observed Velocity (KMS)

Radius (KPC)
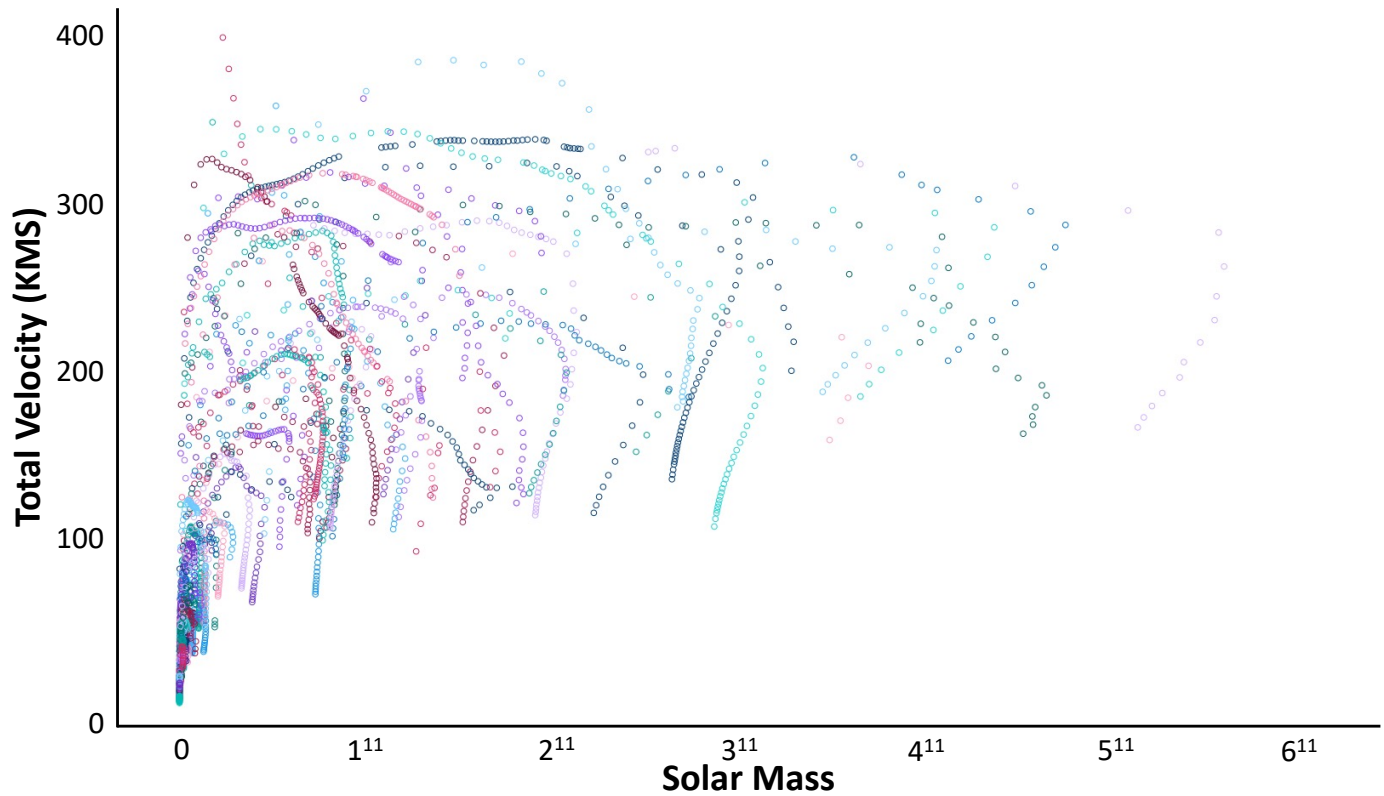
Convergence Zone Three

Radius (KPC)

Convergence Zones Across Galaxies

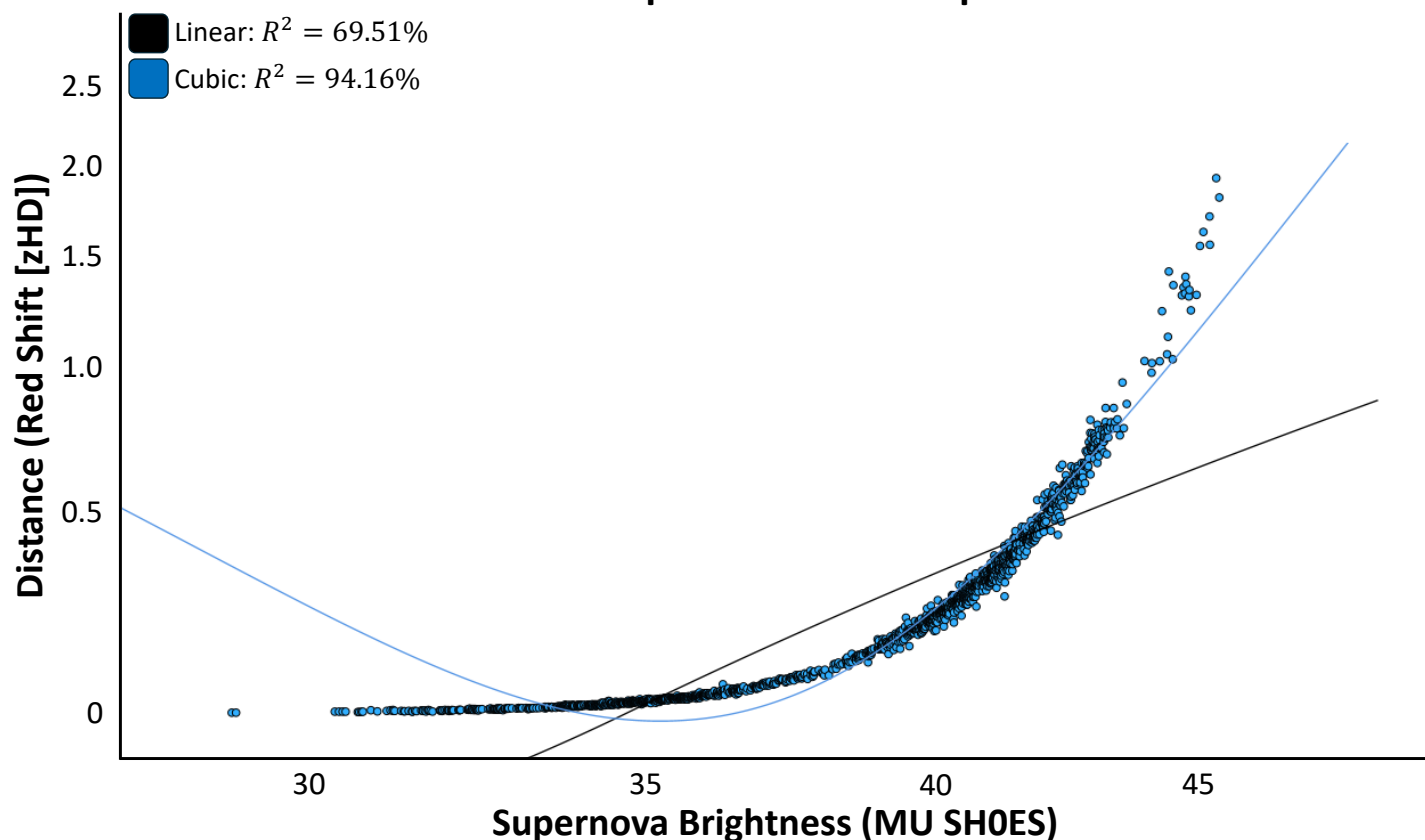
Convergence Zones Across Galaxies

For simplicity, I selected a subset of the galaxies and **plotted their radius by observed velocity**, color-coding each by its galaxy, and I repeated this process for solar mass. This visualization demonstrates that **each galaxy possesses its own unique set of convergence and divergence zones**, further challenging the traditional gravitational model. These results provide compelling evidence that **dark matter is not a particle** and, in fact, is unnecessary for understanding cosmic structure, resolving one of the oldest mysteries in cosmology.

The most profound implication of this research is that **gravity does not explain what holds galaxies together**. Instead, bounded RPs within *The Record* provide the fundamental cohesion for galactic structures. **No additional matter is required to maintain the galactic structures**. *The Record's* ability to hold structures together without traditional gravitational forces is remarkable. Galaxies remain intact not through gravitational attraction, but through the underlying recursive-propagative mechanism. A striking example of this truth can be found in our own Milky Way galaxy, **where the supermassive black hole**, which many believe is responsible for the galaxy's structure, **is located 27,000 light-years from the galactic center, with the center itself remaining empty**.

We can only explain this configuration if gravity is not the primary force maintaining galactic structure. *The Record* **and its recursive convergence and divergence zones emerge as the true mechanism of cosmic organization**, operating through a fundamentally different principle than gravity. This finding reveals that a star's velocity is guided by its specific convergence zone rather than just its radial location. This finding supports the hypothesis that *The Record*, not linear gravity, is responsible for maintaining galactic structure.

Universal Expansion via 1a Supernovas

Legend: Linear: $R^2 = 69.51\%$; Cubic: $R^2 = 94.16\%$

Y-axis: **Distance (Red Shift [zHD])**
X-axis: **Supernova Brightness (MU SH0ES)**

Unbounded RPs in the Universe…

Now we can turn to examine dark energy. In this analysis, I used the **Pantheon+ supernova dataset**, focusing on two critical variables: zHD (heliocentric redshift) and MU_SH0ES (distance modulus). I directly examined the **observational data of zHD and MU_SH0ES across 1,701 supernovae**. When plotting supernova brightness against distance, a remarkable pattern emerges—**a cubic expansion curve explaining an impressive 94% of universal expansion**. These findings reveal a nuanced and structured approach to how the fractal universe

unfolds. The strength of this finding comes in its **empirical confirmation of the theoretical model's predictions about unbounded RPs** that cosmic expansion occurs through cubic growth across Planck-scale RPs, happening at the speed of light (Planck length per Planck time) across three spatial dimensions. What we have interpreted as acceleration caused by a force (dark energy) is now revealed as **a natural consequence of RPs unfolding**.

The question then becomes, if dark energy is not energy, then what is it? The answer is **it is definedness or existence itself,** the effects of unbounded RPs. The **expansion of the universe requires no energy** because it is the functional requirement of existence itself, before energy even comes into the picture. Existence only exists when phenomena are co-defined by others and previous versions of themselves (see more on relational reality in Paper 11). It's not energy expanding the universe… **it's the base functional requirement for something to exist**. Non-existence or undefinedness is not an alternative to existence, as **there is no alternative to existence because non-existence doesn't exist**. Thus, if there is an opening for the next RP via a possible complexity escalation, it will always occur without any energy or force needed, **as RP unfolding occurs underneath all phenomena** (with energy being a phenomenon), which is why we have never measured dark energy directly.

Universal Expansion & General Relativity

The Record is also essential for understanding universal expansion. We acknowledge that general relativity is structurally correct, recognizing that **phenomena like speed and direction require a frame of reference to be meaningful**. When considering the universe's expansion, a critical question emerges: **How can we perceive expansion if there's no reference point?** The expansion cannot be measured relative to galaxies or superclusters, as these are expanding simultaneously. Without a stable frame, how can we confirm the universe is expanding?

The answer is *The Record*—a mechanism that allows the universe to expand relative to itself. As the universe expands, it creates **an ongoing reference by leaving behind imprints** of its previous states. Each expansion becomes relative to these preserved imprints, with each successive expansion serving as **a new reference point for the next**. This recursive-propagative process builds up previous versions of the universe that provide stability to the new ones, ensuring that expansion always has an objective frame of reference.
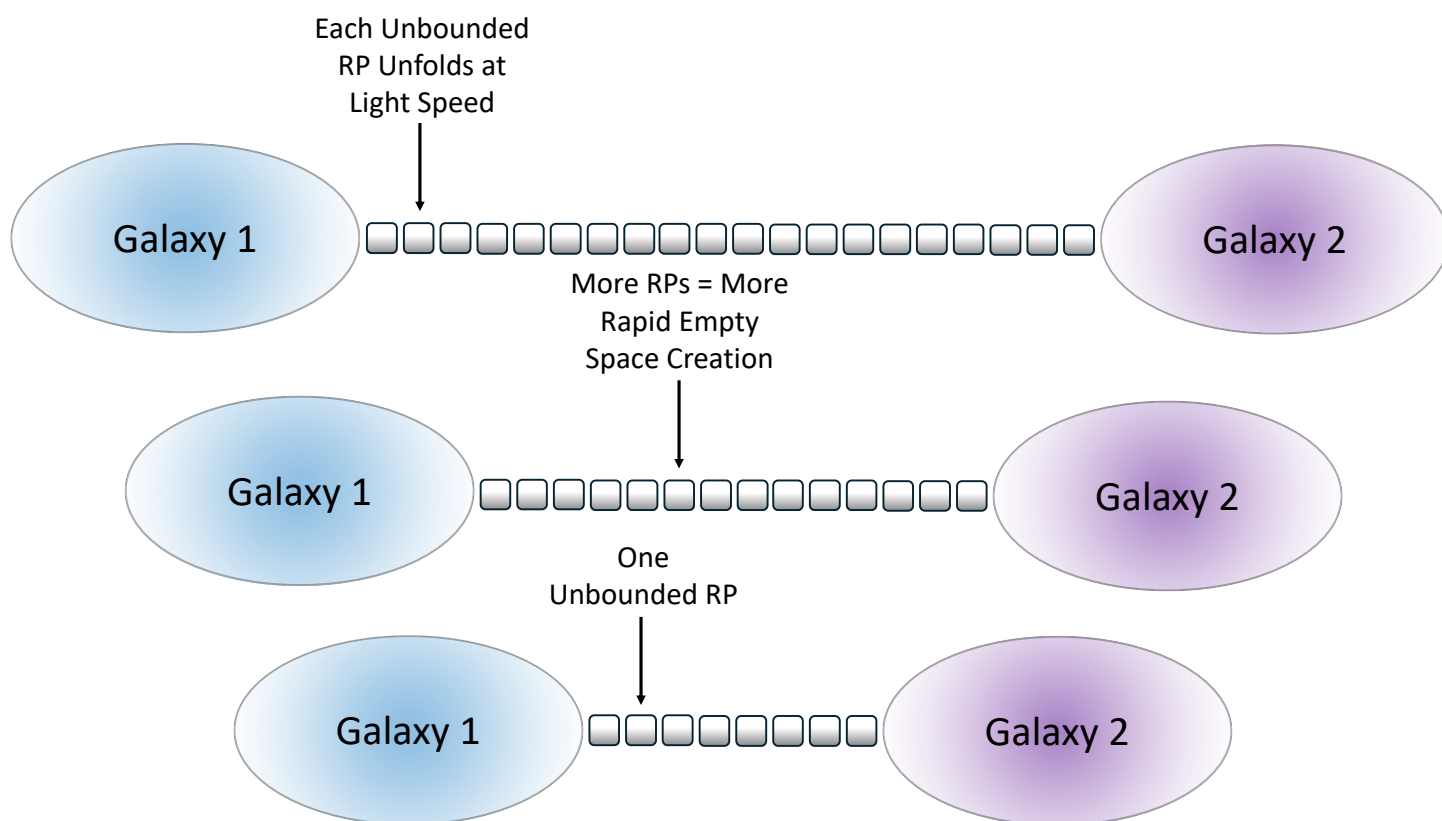
Not Faster than the Speed of Light

A significant misconception currently persists—one that scientists have **repeatedly patched over** rather than confronting the inadequacies of their existing models. According to established calculations, **nothing can travel faster than the speed of light**. However, observational measurements suggest galaxies in the expanding universe are **moving away from each other at speeds exceeding this fundamental limit**. Physicists have attempted to resolve this apparent contradiction by arguing that **the speed of light limitation doesn't apply because spacetime itself is moving apart**—an explanation that defies logical scrutiny. Here's what's happening:

The current cosmological models contain **two critical misconceptions**. First, these models **erroneously equate the empty vacuum of space with non-existence**. However, empty space is a tangible phenomenon we can observe, confirming its actual existence. Second, the **untested, unsupported assumption that time and space are continuous**. By correcting these misunderstandings, the true mechanism of cosmic expansion comes into view.

The unbounded RPs that represent the speed of light are the ultimate velocity boundary. The physicists' current frame of reference creates confusion by focusing solely on the two galaxies, **neglecting the space between them**. The universe expands not just at its edges, but **everywhere simultaneously**. As the universe expands, the space between galaxies is growing, with each empty space "pixel" (RP) expanding at precisely the speed of light. This growing space generates an increasing distance between galaxies. The expansion process works like this: **empty space grows, then that grown space grows again, creating a cascading expansion that forms the cubic curve we saw in the supernova data**. The distance between galaxies increases not through movement, but through the continuous growth of empty space as unbounded RPs—always at the speed of light, never faster.

The Life Cycle of Stars

Cubic: $F(3, 4,940) = 1,766.82, p < .001, R^2 = 51.76\%$

Linear: $F(1, 4,942) = 1,910.83, p < .001, R^2 = 27.88\%$
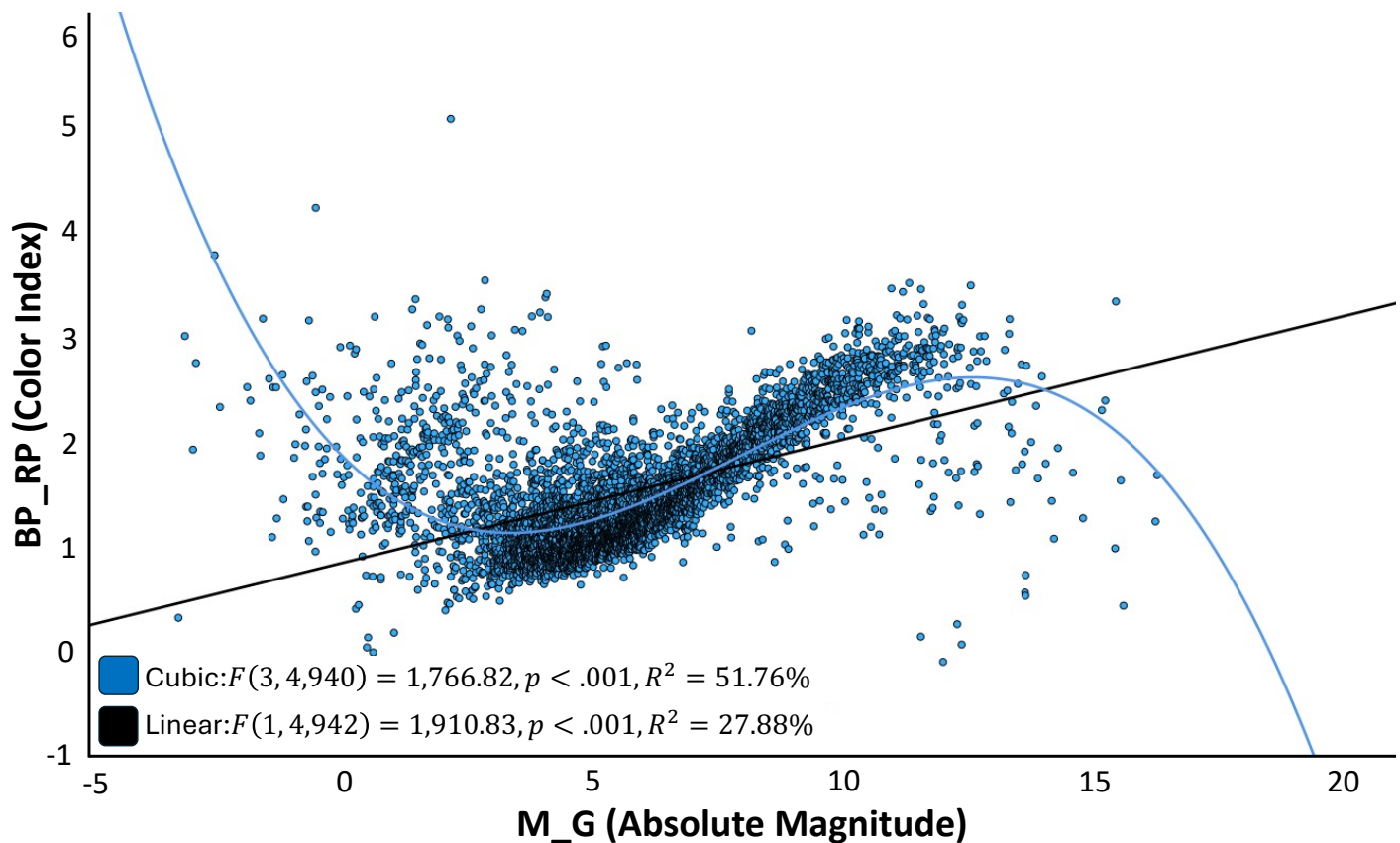
The Life Cycle of the Stars

The fractal universe manifests in the phenomena within it, not just the structure in the vast spirals of galactic spin or the acceleration of distant supernovae. It sings the same pattern **in the unfolding of a single star's life**

cycle. Using **raw observational data** from the **Gaia DR3 archive**, I examined two direct stellar variables: BP_RP (i.e., color index, representing stellar temperature and evolutionary phase) and M_G (i.e., absolute magnitude, representing intrinsic luminosity derived from raw photometric and parallax data). When I plotted them together across a broad sample of 5,000 stars, the same cubic pattern was immediately apparent and stunning.

The cubic model nearly doubled the explanatory power. This finding alone confirmed what *The Theory* predicts about phenomena in the fractal universe. The most notable implication is that **this analysis is not a cross-sectional finding**… **it is a longitudinal insight**. The H-R diagram shown above—the same one used in classical astrophysics to map stellar evolution—is, in truth, **a temporal map of a star's life cycle**. It reveals that stars, as they move from birth through fusion equilibrium, through expansion, collapse, and final decay, **are riding the recursive-propagative curve of definedness that everything else in existence rides**. Stars do not follow separate evolutionary paths, but a single structural principle: **recursive-propagative, stabilized complexity escalations**.

When I ordered these variables, the cubic regression for **M_G alone reached** 98.53%**,** compared to a linear fit of 91.38%. For **BP_RP, the cubic curve reached** 98.92%**,** compared to a linear one 90.79%. By examining the stars themselves, we see that they are lined up along the cubic curve, much like musical notes in harmonic order. These values do not have any parameter tuning, no simulations, no fudge factors… just raw data, plotted plainly, and the universe—once again—**whispered the cubic curve of definedness**. Therefore, not only do galaxies exhibit cubic spin curves from *The Record* convergence and divergence zones, but the universe expands through cubic recursive-propagative definedness, and **every star lives and dies follows the same, inescapable trajectory**. *The Theory* does not just illuminate dark matter and energy—it unifies the story of the fractal universe, revealing **what it is like for all phenomena to exist within it.**

The Big Picture

To understand the fractal universe is to recognize an extraordinary unity that permeates all of reality. The mechanisms governing a single human cell, a sprawling galaxy, or the seemingly empty space between cosmic structures **are fundamentally identical**. This revelation dismantles the artificial boundaries we have constructed between disciplines, between the microscopic and the celestial, between the living and the inanimate.

In a fractal universe, every phenomenon—from intricate neural networks in our brains to the vast filaments of galactic clusters—**follows the same recursive-propagative principles in *The Theory of Existence***. These principles don't describe how things exist; they reveal why things exist. Each component, no matter its scale, contains the blueprint of all of reality, perpetually updating, perpetually becoming…

The Theory offers a radical reimagining of our place in the universe. We are not mere observers of existence, but **active manifestations of its continuous unfolding and escalating complexity**. Every moment is an intricate negotiation between stability and complexity, between what has been and what might emerge. The findings reveal that nothing is truly separate, as **everything that has ever existed and will ever exist is physically** connected to everything else via *The Record*. Everything in existence is simultaneously unique and universal.

We stand at the threshold of a radical understanding: **the universe is not a mystery, but a process of continuous becoming**. Each recursive propagation is a moment of existence, where what was turns into what is, creating the beautiful and vast fractal universe we see around us. **We are not separate from these recursive propagations—we ARE one of its most intricate outcomes**. Our consciousness, our very ability to contemplate these mysteries, is itself a manifestation of the universe's recursive-propagative, fractal nature.

In every moment… in every quantum of space… the fractal universe performs **its beautiful recursive-propagative dance of definedness**. Our thoughts… our emotions… our very existence are threads in the cosmic tapestry of the universe, each recursive propagation a brushstroke in the most magnificent painting ever conceived. You can feel the wonder and awe in illuminating the darkness of the fractal universe, where we see, maybe for the first time, that existence is not a noun… it is a verb… not a state… but a process…. not a thing… **but a becoming**…

A TICKET
TO THE FUTURE

The Equation of Existence, *The Theory of Existence*, *The Story of Existence*, *The Theorem of Existence*, and *The Show of Existence* are *Not Trapped In Cages*. Not one day... right now. But *The Architect*? I am still trapped in cages. If you want to support the further development of this world and keep it free, including the upcoming book *The Guide of Existence: A Light for Darkness,* go to **http://www.thetheoryofexistence.com/The-Store** and get a copy of the books or other merchandise for sale. I will update the store frequently, so check back occasionally to see what is available. You can also donate directly to support me and this work. I appreciate all your support.

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