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Small Bang Model: A New Paradigm for Understanding Universe Creation

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Abstract
The Small Bang Model (SBM) introduces a revolutionary framework for the genesis of the universe, challenging conventional cosmological theories. By suggesting the universe originated from a zero-mass state, facilitated by antimatter black holes, the SBM provides fresh insights into galaxy formation and the distribution of matter and antimatter. This paper outlines the SBM's foundational principles, contrasts it with the Big Bang theory, and highlights its potential to resolve longstanding cosmological puzzles. Notably, it presents empirical validations demonstrating distinct mass relationships between supermassive black holes and their host galaxies, supporting a novel classification into matter and antimatter galaxies. The Small Bang model is founded on two pivotal concepts: the theory of Cosmic Inflation and the principle of 'Shunyata Universe's Gene- sis' (or 'Emptiness Universe's Genesis'), a framework envisioning the universe's inception as small, empty, and cold, entirely devoid of matter or energy. These SBM findings offer a groundbreaking perspective on the early universe's dynamics and the distribution of cosmic matter, deepening our understanding of cosmic inflation. Consequently, we invite physicists to study, comprehend, and assess the new cosmological model proposed by the Small Bang Model.

Keywords: Cosmic Inflation, Inflation Field, Antimatter Black Holes, Matter-Antimatter Asymmetry, Galaxy Formation, Quantum Fluctuations, Cosmological Theories, Dark Matter, Supermassive Black Holes, Big Bang, Small Bang

1. Introduction

The origins of the universe have perennially fascinated scientists, with the Big Bang theory predominating in cosmological discussions for decades [1]. Yet, certain observational anomalies remain unresolved. The Small Bang Model (SBM) presents an intriguing alternative, based on the principle of 'Shunyata Universe's Genesis' (or 'Emptiness Universe's Genesis') which proposes that the universe emerges from 'nothing' a state of zero mass and energy [2]. This model elucidates the genesis of matter through antimatter black holes, offering a unique mechanism for universe creation and it is possible that SBM also explains the origin of dark matter [3].

The principal distinction between the Small Bang Model and the Big Bang lies in the critical time interval of one millisecond, from the universe's inception to the end of cosmic inflation. Beyond cosmic inflation, both models converge, exhibiting similar energy, mass, and average temperature profiles.

The Small Bang Model posits an initial energy density of zero for the universe. All matter and energy emerge during cosmic inflation, wherein micro black holes (μBHs) serve as catalysts, extracting energy from the inflation field the driving force behind cosmic inflation—and transforming it into matter and antimatter. This process leads to:

- The transformation of a μBH into a supermassive black hole (SMBH).
- The formation of a spiral hydrogen cloud hundreds of light years in diameter around each SMBH.

While the mass of the cloud and the SMBH should be equivalent, the Small Bang Model anticipates a significant mass reduction (95 to 99.9%) of particles absorbed by the SMBH. The energy from this mass reduction is converted into the SMBH's rotational kinetic energy, even though the SMBH constitutes only 1/1000 of the galaxy's mass. This conversion results in energy that exceeds the galaxy's rotational kinetic energy, suggesting the SMBH and the galaxy rotate in opposite directions, thereby balancing the total angular momentum to zero. The exceptional rotational velocity of the black hole could account for the anomaly of galaxies spinning faster than expected, a phenomenon often ascribed to dark matter.

1.1 The Big Bang Theory

The Big Bang theory, grounded in Hubble's observations, posits that the universe originated from a singular, extremely dense, and hot point, which has been expanding over time [4]. It accounts for the early formation of hydrogen and helium and asserts the existence of cosmic microwave background radiation as remnants of the initial hot, dense state. Despite its success in elucidating many cosmic phenomena, the Big Bang theory has shortcomings, especially concerning the uniformity of the universe and the matter-antimatter distribution.

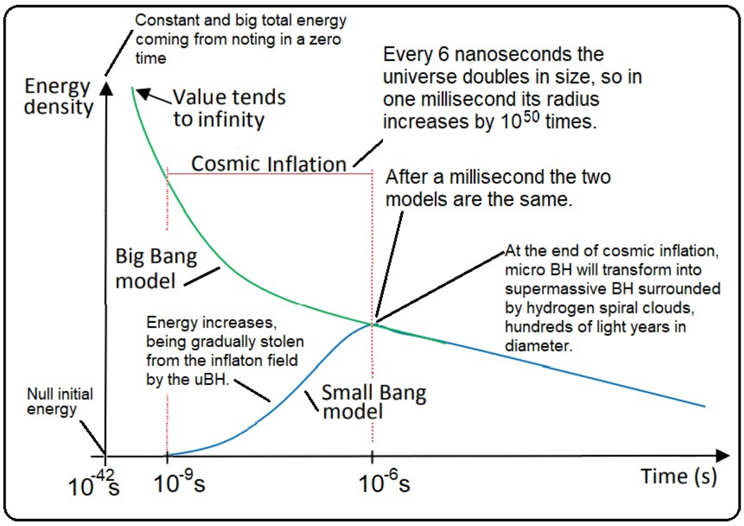

Figure 1: Energy density in Big Bang model and Small Bang model.

1.2 Cosmic Inflation Theory

The Cosmic Inflation Theory, proposed in 1979 by physicist Alan Guth, serves as a foundational pillar for the Small Bang Model [5]. This is in accordance with the “Shunyata Universe’s Genesis” principle (alternatively, “Emptiness Universe’s Genesis” principle), which posits that the universe began as a small, empty, and cold void devoid of matter or energy. Consequently, all matter and energy observed in our universe today are derived from energy provided by the inflation field over its duration. Dr. Guth proposed the Cosmic Inflation Theory to address certain cosmological puzzles, suggesting a period of exponential expansion shortly after the universe’s inception. This rapid expansion, driven by a hypothetical inflationary field referred to as the Inflation field, aims to explain the observed uniformity of the cosmic microwave background radiation and the large-scale structure of the cosmos [6]. According to the theory, the universe expanded from a microscopic to a macroscopic scale in a fraction of a second, setting the stage for the formation of galaxies, stars, and planets.

To this day, within the Big Bang model framework, the core concept of cosmic inflation is widely accepted. However, there lacks concrete experimental data on cosmic inflation that would, for instance, allow for the precise calculation of its occurrence and the detailing of its main parameters.

This gap is now being bridged by the Small Bang Model (SBM). As cosmic inflation underpins the SBM, it offers a comprehensive account of the events at the dawn of the universe, predicated on the inflation field. This approach not only establishes a theoretical foundation to understood our universe origin but also furnishes evidence for the existence of the inflation and enables the detailed calculation of its characteristics, including its duration.

1.3 Limitations of the Big Bang Theory

Despite widespread acceptance, the Big Bang theory grapples with unresolved issues, such as the initial singularity problem, the unexplained dominance of matter over antimatter, the origin of dark matter, and mysteries surrounding galaxy structure formation. This includes the omnipresence of supermassive black holes at the centers of galaxies and their proportional mass relationship with the galaxies themselves [7,8]. These challenges underscore the current models’ limitations in fully capturing the universe’s complexities, highlighting the necessity for alternative or complementary theories that can tackle these phenomena.

1.4 Could Supermassive Black Holes Be Composed of Antimatter?

Recent experiments, including those by Alpha-CERN, have begun to blur the distinctions between matter and antimatter, especially in terms of their gravitational properties [9]. This ambiguity extends to supermassive black holes (SMBHs), which have traditionally been considered to be composed of matter [10]. Given the gravitational indistinguishably of matter and antimatter, it raises the intriguing possibility that SMBHs, including the one at the center of our Milky Way, could actually be anti- matter supermassive black holes (ASMBHs). This idea challenges the conventional understanding of matter-antimatter annihilation and offers a novel perspective on the distribution of antimatter in the universe. It suggests that these cosmic behemoths may be concealing vast amounts of antimatter within their event horizons. This hypothesis paves new pathways for exploring the mysteries of antimatter, without necessarily resorting to CP violation, by proposing that the absence of observable antimatter in the universe could be due to its confinement within SMBHs [11]. It is important to note that if a supermassive black hole were composed of antimatter, we would not observe any matter-antimatter annihilation phenomena outside its event horizon;

any annihilation occurring within the event horizon would not transmit information beyond the black hole. Moreover, the orbital behavior of stars around the Milky Way's central supermassive black hole would remain consistent, regardless of whether the black hole is composed of matter or antimatter.

1.5 The Impact of Cosmic Inflation on Virtual Particles in Void Space

Cosmic inflation, the rapid expansion following the universe's inception, plays a crucial role in shaping the cosmos. Quantum Mechanics suggests that quantum fluctuations can create virtual particle pairs in void spaces, including various particles and micro black holes (µBHs) of matter and antimatter [12].

During cosmic inflation, the accelerated expansion of space has the capability to separate these virtual particle pairs, turning them into real particles of matter and antimatter. The inflation field's vast energy deferentially affects particles: while protons and electrons remain unaffected, photons lose energy, and micro black holes (µBHs) grow by converting energy from the inflation field into matter and antimatter. This results in matter µBHs absorbing matter and expelling antimatter, and vice versa for antimatter µBHs, which may lead to the formation of hydrogen atom clouds.

The Ulianov Theory suggests a faster growth rate for antimatter µBHs com- pared to their matter counterparts, potentially explaining the observed dominance of matter in the universe by proposing that antimatter is sequestered within these µBHs [13]. The growth of a micro black hole (µBH) can be illustrated through an analogy with a circular saw expanding in ice, driven by a mechanical energy source. Initially, the saw has a small radius and creates a hole by drilling into the ice, expelling only tiny ice flakes due to vibrations. As a mechanism increases the saw's radius, the hole widens, expelling spiral jets of ice in all directions. If the mechanism loses power, the saw stops growing and no longer expels ice. This analogy demonstrates how black holes can break virtual particles along the equator of their event horizon, absorbing both particles and antiparticles without any increase in the black hole's mass. However, as the inflation field stretches the antimatter micro black hole, it may grow by consuming antimatter and expelling matter, just as the saw expands the hole by expelling ice. Thus, a µBH acts as a matter/antimatter generator, powered by cosmic inflation and inflation field energy. This process offers a nuanced understanding of the universe's early development. This growth mechanism indicates that antimatter black holes could be a significant factor in the universe's early development, possibly explaining the fast spin of galaxies—a phenomenon often attributed to dark matter—by suggesting that supermassive black holes (SMBHs) and their surrounding galaxies rotate in opposite directions.

Moreover, the dramatic increase in the mass of a µBH during cosmic inflation, alongside the expansion of surrounding hydrogen clouds, aligns with the Small Bang model. This model posits that such processes contribute to the formation of SMBHs and the large-scale structure of galaxies, offering a novel explanation for the distribution of matter and antimatter in the universe.

However, questions remain, particularly regarding why antimatter µBHs grow faster and how this growth influences the mass relationship between SMBHs and galaxies. Despite these unresolved issues, the model provides a compelling framework for understanding the early universe, challenging traditional perspectives and suggesting new avenues for research.

2. Methodology

The Small Bang Model integrates theoretical principles from Quantum Mechanics, General Relativity, and Cosmic Inflation, diverging from classical cosmology by proposing a universe that begins from a state of zero mass and energy [12]. This model suggests that all observable matter and energy were generated by micro black holes, which grew into supermassive black holes (SMBHs), powered by energy from the inflation field. This approach circumvents the issue of infinite energy density at the universe's inception and explains the presence of SMBHs at the centers of galaxies, from which matter was expelled, forming hydrogen clouds with spiral arms. Key points include:

- The universe initially expands from a cold, empty state, with an initial diameter of one Planck length, rapidly expanding to several meters within nanoseconds.
- This expansion facilitates the appearance of virtual particle pairs, which are pre- vented from annihilating due to cosmic inflation, leading to the creation of real particle pairs.

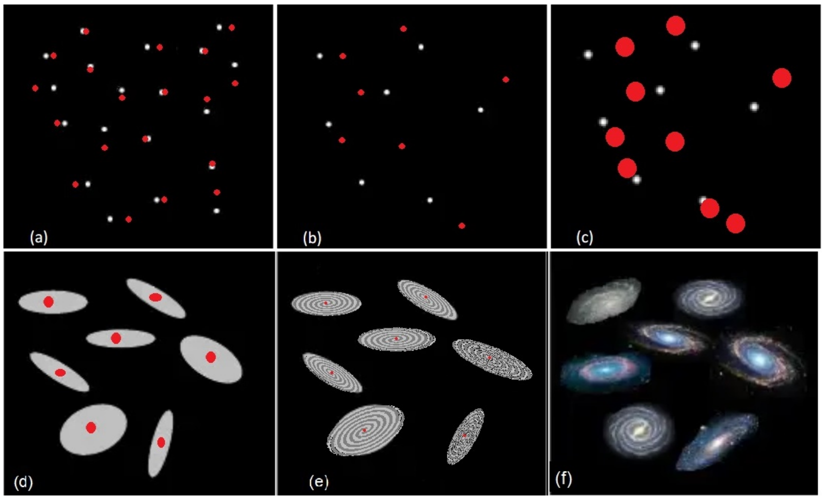

Figure 2: Evolution of the universe in the Small Bang Model: (a) Universe's inception (0 to 10^{-10}s) showing expansion at light speed from a Planck-length bubble to a vacuum bubble with a diameter of one meter; (b) Onset of cosmic inflation (10^{-10}s), preventing virtual particles from annihilating and creating matter and antimatter micro black holes (µBHs); (c) Shortly after cosmic inflation begins (10^{-9}s), µBHs grow by absorbing antimatter and expelling matter, powered by the inflation field; (d) Immediately after the start of cosmic inflation (10^{-8}s), antimatter µBHs dominate, forming clouds of matter around them; (e) End of cosmic inflation (10^{-6}s), with the inflation field expanding space by a factor of 1040 to 1050, causing the matter clouds around SMBHs to reach diameters of 50,000 to 500,000 light-years; (f) From 100 million years after the Big Bang to the present, hydrogen clouds collapse under gravity to form the first stars, illuminating galaxies and continuing the cycle of stellar birth and death up to 13.8 billion years after the universe's inception.

- Cosmic inflation's effect on these particles varies:

o Photons expand and lose energy, resulting in longer wavelengths.

o Proton and antiproton (as well as electron and positron) pairs are created in equal quantities, later annihilating each other unless prevented by spatial expansion.

o μBHs of matter and antimatter grow, with their mass increasing in proportion to the event horizon's radius.

- μBHs increase their mass by breaking virtual particle pairs at their event horizons, a process intensified by the inflation field, making Hawking radiation billions of times more efficient, separating high energy virtual pair (proton-antiprotons and electrons-positrons) in to real particles (generating masses, stolen inflation field energy) and leading to the growth of antimatter μBHs by consuming the antimatter particles and expelling the matter ones [14].
- The Small Bang Model proposes a faster growth rate for antimatter µBHs over matter µBHs, leading to the predominance of antimatter SMBHs. This is suggested to explain the observed matter dominance in the universe without invoking CP violation, positing that antimatter is confined within SMBHs.
- The model also incorporates elements from the Ulianov String Theory, suggesting that particles assume different masses when falling into a black hole depending on their nature (matter or antimatter) and the type of black hole, contributing to the differences in mass between galaxies and their central SMBHs.
- An interesting outcome of the model is the increase in SMBHs' rotational speed when consuming massive particles, impacting the rotational dynamics of galaxies and potentially explaining the observed discrepancy in galactic rotation speeds without resorting to dark matter.
- This methodology outlines a novel framework for understanding the early uni- verse's development, addressing several unresolved questions within conventional cosmological theories.

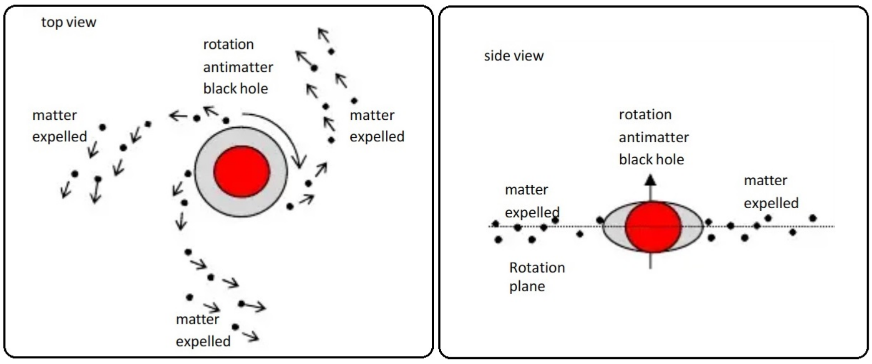

Figure 3: Rotating antimatter micro black hole cutting virtual particles in its equator line, absorbing antiprotons and positrons and emitting protons and electrons.a

3. Results

Key predictions of the Small Bang Model, including: The easy model of the space beginning empty and cold with no singularity points. The explanation of SMBH formation and spiral hydrogen clouds construction from two or four jets of hydrogen expelled in the SMBH grown process. The explanation that any SBMH has one galaxy surrounding it. The resolution of the enigma that where is the antimatter [15].

The only point not fully resolved in the small Bang model, it is the cause of cosmic inflation and where the energy of the inflation field comes from. But in any case, these are questions that the Big Bang model does not answer either. Based on UST string particles wrapping modes we can also calculate in the Small Bang model, the log relation between one galaxy mass and its central supermassive black hole mass:

$$log(M_{\text{Stellar}}/M_{\text{ASMBH}}) = 2.963 \tag{1}$$

Where M_{ASMBH} is the mass of one antimatter SMBH and M_{Stellar} is the mass of it matter galaxy.

$$log(M_{\text{AStellar}}/M_{\text{SMBH}}) = 2.285 \tag{2}$$

Where MSMBH is the mass of one matter SMBH and M_{AStellar} is the mass of it antimatter galaxy.
The Small Bang can also predict relation of one galaxy mass and dark matter mass that the astronomers believe existing inside it:

$$\frac{M_{\text{Dark}}}{M_{\text{Stellar}}} = 5.5 \tag{3}$$

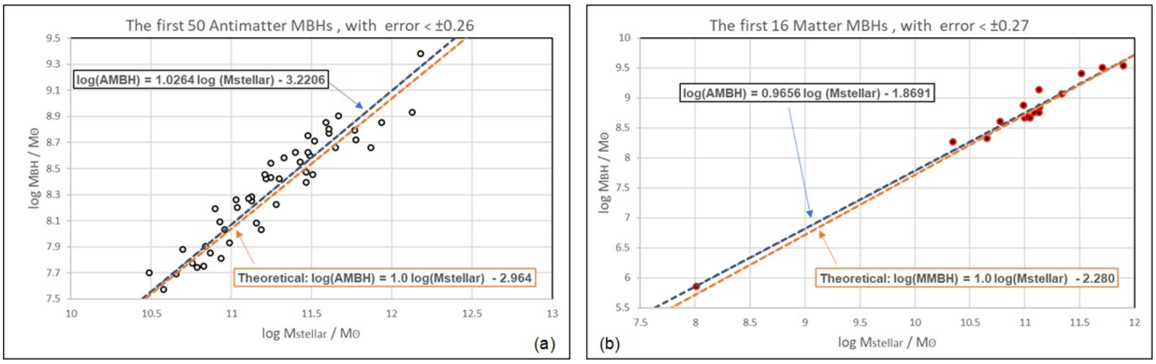

Figure 4: a) Graph depicting a logarithmic plot of the mass of 50 antimatter SMBHs against the mass of their respective host galaxies. Data includes only points from the Antimatter SMBH - Matter Galaxy Table (selected from a total of 77 available) where the total error is less than ±0.26; b) Graph depicting a logarithmic plot of the mass of 16 matter SMBHs against the mass of their respective host galaxies of antimatter. Data includes only points from the Matter SMBH - Antimatter Galaxy Table (selected from a total of 23 available) where the total error is less than ±0.27.

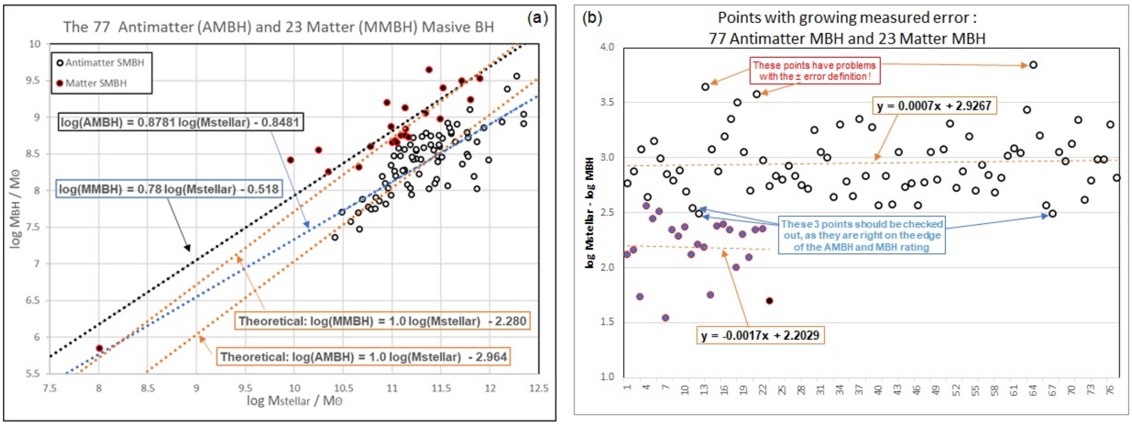

Figure 5: a) Graph showing a logarithmic plot of the mass for each type of SMBH relative to the mass of its host galaxy
b) Logarithm of the ratio ($M_{\text{stellar}}/M_{\text{BH}}$) for the two types of SMBHs. With both galaxy types and SMBHs mixed and with 30% of the points exhibiting significant noise, these graphs present considerable interpretive challenges. The overlapping datasets obscure the existence of two distinct relationships between galaxy masses and their SMBHs, a subtlety that has eluded physicists due to the perception of these data points as a homogenous set, compounded by measurement noise that obscures these underlying patterns.

Where M_{Stellar} is the mass of one matter galaxy and M_{Dark} is the mass of dark matter that the astronomers supposed that existed in this galaxy.

$$\frac{M_{\text{Dark}}}{M_{\text{AStellar}}} = 3.7 \tag{4}$$

Where M_{AStellar} is the mass of one antimatter galaxy and M_{Dark} is the mass of dark matter that the astronomers supposed that existed in this galaxy.

The Small Bang Model, offer a fresh perspective on galactic structure and evolution. By providing potential explanations for phenomena such as dark matter and the observed distribution of galaxies, the SBM contributes a new lens through which the cosmos can be understood.

4. Discussion

This section delves into the nuanced implications of the Small Bang Model (SBM), particularly focusing on its empirical underpinnings and theoretical predictions. The Figures 4 and 5 present data from log relations of 100 supermassive black holes (SMBH) and galaxies masses. The graphics in these figures play a pivotal role in substantiating the SBM's assertions regarding the mass correlations between one SMBH mass and its host galaxy mass.

4.1 Empirical Analysis

Figure 4 presents two mass relationships:

- Between antimatter SMBHs and their matter host galaxies,
- Between matter SMBHs within their antimatter galaxies.

This differential analysis, predicated on reducing error margins by excluding data points with high mass errors, reveals a striking correlation between the observed data and the SBM's theoretical predictions in equations 2 and 1. Specifically, Figures 4 (a) and (b) showcase a near-perfect alignment of the logarithmic plots (theoretical orange lines) with the empirical data (interpolated blue lines), underpinning the SBM's experimental validity over 66 galaxies randomly chosen, only avoiding points with high measurement errors that contain more noise than signal information.

Moreover, Figure 5 broadens this analysis by incorporating the entire dataset of 100 points, delineating a demarcation between matter and antimatter galaxies. This distinction is less evident than in Figure 4 due to the presence of many points (34%) with high measurement errors that generate false differentiation between theoretical and interpolated lines. Nevertheless, even with so many noisy points in Figure 5, it is still possible to see that there are two distinct groups of mass ratios (two parallel lines), one associated with matter galaxies and the other with antimatter galaxies. It is worth noting that without this separation into two groups and without eliminating points with high measurement errors (which are basically noise), it is impossible to obtain the two graphs presented in Figure 4 graphics (a) and (b) where it is clear that the experimental data (considering the error margins of measurement in each point) are exactly within the range predicted by the theory used in the context of UST, given log mass relations values as indicated in equations 2 and 1. As astrophysicists were looking for a single relationship between the mass of the supermassive black hole and the mass of the galaxy and due to the large measurement error inherent in the available data, these two relationships have not yet been discovered until today. This scenario enlightened the fact that without an adequate theoretical model, experimental data is difficult to fully understand. In this context, the division into two types of galaxies, proposed by the SBM, generates a new path that allows us to visualize these theoretical relationships that were found in the 100 galaxies analyzed and that certainly exist in the entire set of galaxies that are available today.

4.2 Dark Matter Reconsidered

The SBM offers a radical reinterpretation of dark matter's role within cosmic structures. By observing the logarithmic ratios of dark matter to stellar mass across galaxies and identifying distinct groupings—5.5 times for matter galaxies and 3.7 times for antimatter galaxies—this model posits that the phenomena attributed to dark matter may instead be secondary effects of the elevated rotational speeds of SMBHs. This hypothesis not only challenges conventional dark matter theories but also provides a novel metric for classifying galaxies into matter and antimatter types, thereby further validating the SBM.

4.3 UST Gravitational Model and Future Prospects

An intriguing aspect of the Ulianov String Theory (UST) that has yet to be fully explored within the context of the SBM is its prediction of an antimatter gravitational acceleration (g value) of approximately 7.7 m/s2 on Earth's surface. This prediction is poised for empirical validation through forthcoming experiments with antihydrogen atoms at the Alpha - CERN laboratory. The confirmation of this prediction would not only bolster the SBM and UST's credibility but also advance our understanding of gravitational interactions in antimatter.

4.4 Invite to the Astronomers and Astrophysicists

In the context of the Small Bang Model, the author trusts and invites astronomers and astrophysicists to follow the procedure outlined below: Based on available databases that contain the masses of galaxies and their SMBHs, and the associated theoretical mass measurement errors (TMME):

- Calculate the logarithm of the galaxy's mass divided by its SMBH mass and, from the two available TMMEs, estimate the total log mass error (TLME) associated with the obtained log value (for example, by using a simple square mean error formula).
- Divide the data into two groups, one with a low value of TLME (for example: TLME < 0.20) and discard the remaining points. The goal is to maintain between 50% to 80% as valid points; if fewer points qualify, the limit needs to be increased (for example: TLME < 0.30).
- In data with low TLME, separate into two data sets: log values close to 2.964 (above 2.7), which should be initially labeled as

matter galaxies, and values close to 2.28 (below 2.4), which should be labeled as antimatter galaxies.

- Values in the range of 2.4 to 2.7 should be classified as mixed galaxies because they fall into a cloudy region that must be classified using other methodologies.
- For matter galaxies, a new mass theoretical error (MTE) can be calculated as:

$$MTE = \log(M_{\text{Stellar}}/M_{\text{SMBH}}) - 2.96.$$

- For antimatter galaxies, the MTE can be calculated as: $MTE = \log(M_{\text{AStellar}}/M_{\text{SMBH}}) - 2.28$.
- Comparing the TLME value with MTE allows us to assess whether the original TMMEs were well-defined. If the TMMEs were obtained through complete error source analyses and true error propagation calculations, it is expected that in all points: $MTE < TLME + 0.20$. If this condition is violated at any point, the measurement error calculation must be redone.
- Therefore, the first practical and positive result of this study is to observe whether the TMME calculations were carried out correctly and whether there are additional sources of error not considered or parameters miscalculated. Given a practical example, the result of this procedure over the 100 galaxies/SMBH database is presented in Figure 6 where 15 points were classified as mixed galaxies (we do not know if they are matter or antimatter galaxies) and 85 points were divided into 61 matter galaxies and 24 antimatter galaxies. Using the empirical rule MTE < TLME + 0.20, we can see that only five points present values of theoretical mass measurement errors higher than the mass theoretical error plus 0.2. Therefore, the astronomers who made these TMME calculations deserve praise, as, in principle, 95% of the points studied are correct, with only 5% of points having a problem in the TMME calculation (TMME value may need to be adjusted and possibly some error source was not considered).
- Having in hand the two supposed sets of matter and antimatter galaxies, the ratio of dark matter existing in each set can be calculated, and it is expected to obtain a value in the range of 5.0 to 6.0 (mean of 5.5) for matter galaxies and a mean value of 3.7 for antimatter galaxies, or at least two distinct average values, with the highest value being associated with galaxies of matter.
- Observing the distribution in space of galaxies classified as antimatter, they must be counted in smaller quantities (in the order of 25% of the total) and must form clusters well isolated from the matter galaxies, as if they were plums inserted into a pudding.

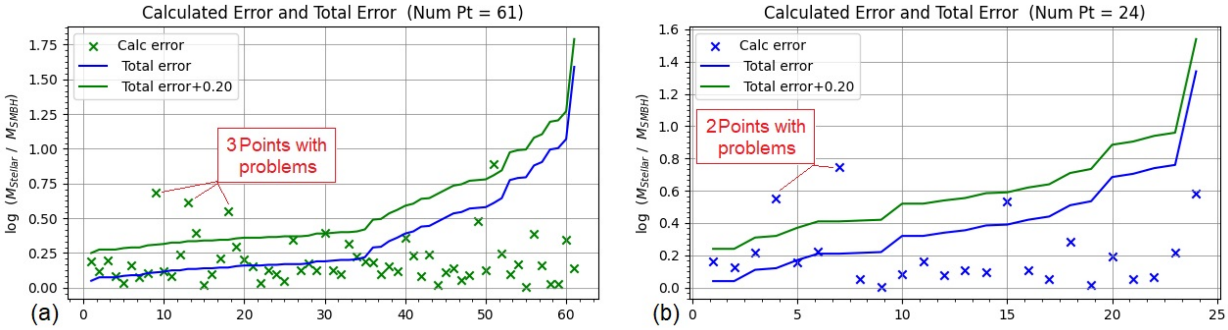

Figure 6: Comparison between total error (TLME) and SBM calculated error (MTE) for an 85 galaxies/SMBH data set, with 15 galaxies classified as mixed galaxies excluded from this analysis. (a) Errors observed in a group of 61 galaxies that represented the final count of matter galaxies (excluding mixed galaxies), with only 3 points not obeying the rule: MTE < TLME + 0.20.
(b) Errors observed in a group of 24 galaxies that represented the final count of antimatter galaxies (excluding mixed galaxies), with only 2 points not obeying the rule: MTE < TLME + 0.20.

5. Conclusion

The discussions presented herein, supported by empirical analyses and theoretical considerations, illuminate the robustness and predictive power of the Small Bang Model (SBM). By challenging traditional cosmological paradigms and proposing innovative explanations for long-standing astronomical mysteries, the SBM and Ulianov String Theory (UST) collectively offer a promising frontier in our quest to decipher the universe's origins and composition. As we stand on the cusp of potentially ground- breaking discoveries in particle physics and cosmology, the importance of continued empirical validation and theoretical exploration cannot be overstated.

The Small Bang Model (SBM) represents a significant paradigm shift in cosmology, offering novel explanations for the universe's origin, the formation of supermassive black holes (SMBHs), and the distribution of matter and antimatter. This model diverges from classical theories by applying the principle of 'Shunyata Universe's Genesis' (or 'Emptiness Universe's Genesis'), proposing a universe that originates from an essentially empty state, devoid of the singularities posited by the Big Bang theory. By integrating insights from the Ulianov Theory (UT) and addressing the enigma of antimatter's absence, the SBM provides a comprehensive framework that reconciles various cosmological observations with theoretical physics.

Key contributions of the SBM and related analyses include:

- A compelling model for the universe's inception as cold and void of singularity points, simplifying the cosmological origin without infinite densities or temperatures.
- An explanation for the formation of SMBHs and the associated creation of spiral hydrogen clouds, through mechanisms that detail the growth process and matter ejection of SMBHs.
- Insights into the prevalent matter-antimatter asymmetry, suggesting a universe comprising 77% matter galaxies and 23% antimatter galaxies, with antimatter primarily sequestered within SMBHs at galaxy centers.

- The elucidation of dark matter effects as attributable to the high angular momentum of SMBHs and spacetime drag, offering an alternative to conventional dark matter theories.

Our analysis underscores the need for precision in optical measurements, as evidenced by the close alignment of observed and predicted errors across a significant dataset. This precision bolsters the SBM's validity and encourages further investigation into the matter-antimatter distribution and the nature of cosmic inflation.

Furthermore, the SBM suggests a methodological approach for classifying spiral galaxies and probing the homogeneity of stellar masses within galaxies, which remains a challenge in contemporary astronomy. The detection of two distinct SMBH categories matter and antimatter opens new avenues for understanding galaxy formation and evolution.

In conclusion, while the SBM and UT introduce concepts that may initially invoke skepticism, their empirical foundations and the coherence of their predictions with observational data invite a reevaluation of existing cosmological models. The SBM, in particular, innovates upon the nearly century-old idea of a "cosmic egg," eliminating the need for such a construct and offering a refreshing perspective on our universe's origins. As we advance, it becomes imperative to explore these theories further, lever- aging both observational astronomy and particle physics, to unravel the complexities of our cosmos.

References

1. Weinberg, S. (1999). *The first three minutes: a modern view of the origin of the universe*. New York: Basic Books.
2. Ulianov, P. Y., & Freeman, A. G. (2015). Small Bang Model A New Model to Explain the Origin of Our Universe. *Global Journal of Physics, 3*(1), 150-164.
3. Freeman, A., & Ulianov, P. Y. (2012). The Small Bang Model-A New Explanation for Dark Matter Based on Antimatter Super Massive Black Holes.
4. Roos, M. (2008). *Expansion of the universe-Standard Big Bang model* (No. arXiv: 0802.2005).
5. Guth, A. Was cosmic inflation the'BANG'of the BIG BANG? The Beamline 27, 14, 1997.
6. Guth, A. H. (1981). Inflationary universe: A possible solution to the horizon and flatness problems. *Physical Review D, 23*(2), 347.
7. Sanders, R. H. (2010). *The dark matter problem: a historical perspective.* Cambridge University Press.
8. Barss, P. (2021). The mysterious origins of Universe's biggest black holes. BBC.
9. Anderson, E. K., Baker, C. J., Bertsche, W., Bhatt, N. M., Bonomi, G., Capra, A., ... & Wurtele, J. S. (2023). Observation of the effect of gravity on the motion of antimatter. *Nature, 621*(7980), 716-722.
10. Regan, J. A., Downes, T. P., Volonteri, M., Beckmann, R., Lupi, A., Trebitsch, M., & Dubois, Y. (2019). Super-Eddington accretion and feedback from the first massive seed black holes. *Monthly Notices of the Royal Astronomical Society, 486*(3), 3892-3906.
11. Sakharov, A. D. (1998). Violation of CP-invariance, C-asymmetry, and baryon asymmetry of the Universe. In *In The Intermissions… Collected Works on Research into the Essentials of Theoretical Physics in Russian Federal Nuclear Center, Arzamas-16* (pp. 84-87).
12. Hey, A. J., & Walters, P. (2003). T*he new quantum universe.* Cambridge University Press.
13. Ulianov, P.Y. (2023). A Comprehensive Overview of the Ulianov Theory.
14. Hawking, S. W. (1974). Black hole explosions?. *Nature*, *248*(5443), 30-31.
15. Ulianov, P. Y. (2024). Antimatter Enigma Solved: Astronomical Data Allows Identification of 77 Supermassive Antimatter Black Holes and 23 Antimatter Galaxies. *Ann Comp Phy Material Sci, 1*(1), 01-15.