

# Data-Driven Insights to Cosmology in the Dark Universe

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The research provides a qualitative analysis with data-driven evidence on the dark energy and dark universe in cosmology and large-scale structure. It provides a descriptive account of the causal significance of black hole and white hole thermonuclear binding to instrumental observational schemes. The article adopted a postpositive paradigm in reorganizing from the previous experimental procedures and finer details not previously covered. The qualitative research into the dark universe has not yet reached a quantifiable stage but may contribute to the data-driven and informatics approaches to the supplement of the simulation methods that underly the services for observation coordination. The research proposes that the change in Shannon Entropy with regard to fundamental asymmetry and CP violation may contribute to data-driven insights into the cosmological large-scale structure, with an electrolyte and hydrolysis approach to quantum superconductive information.

**Keywords:** Black Hole, White Hole, Plasma Analysis, Black Hole Seed, White Hole Seed, Large-Scale Structure, Isospin, Strong CP Violation, Cosmic Complexity, Proton Decay, Nucleon Heuristics, Plank scale

**Introduction**

Two of the most currently widely accepted theoretical approaches to the dark universe are  $\Lambda$  Cold Dark Matter ( $\Lambda$ CDM) cosmology and Conformal Cyclic Cosmology (CCC), with the latter focused more on the fundamental question in the Big Bang Theory (BB) and cosmogenesis [1,2]. From the visible-wavelength-coordinated observational perspective to astrophysical research, black hole seeds (BH seeds) and correspondently theorized light seeds approached the question from star formation and large-scale structure [3]. In the model from recent James-Webb infrared observations, the model of light and heavy BH seeds contributing to the same mass and luminosity bins was put forth in the circumnuclear region of BH event horizon [4,5]. A general relativistic perspective took a descriptive account of the region as Magnetosphere Eternally Collapsing Object (MECO) in the place on the question of time beyond the event horizon [6].

With a nucleon heuristic approach to the thermonuclear connotations in wavelengths, the evidence-driven research remotely accessed observational data from NASA Data Challenge in FITS protocols with electronic device (iMac 5K 2015 model) [7-12]. Numerical extraction from the multispectral sources in the nucleon heuristics to photometry in the form of computational floats was aided by SAOImageDS9 MacOS with features of ZScales supplementing JS9-4L online [13,14]. Traditional approaches to Shannon Entropy adhere to topological distribution but do not take

information as a “thing in itself” [15]. From the primary cosmic correspondence in the form of decayed signals to instrumentation detection, the assumption and presumption of information symmetry in data practice sacrifice qualitative analysis with quantitative perspectives [16]. The nucleon heuristics take information floats for particle and subatomic symbolics with a particle-filtering process applied both to the multi-wavelength data and cosmological observation, where every element of the system acts as an information-processing unit producing a datastream of ‘symbols’ with statistical complexities from angular momenta [17,18].

BHs are known to be only describable by charge, spin, and angular momentum. Charge Parity violations (CP Violations) are known to occur mostly in  $\beta$  decays and W asymmetry, with strong CP violation in Quantum Chromodynamics (QCD) Lagrangian still lacking a clear solution [19]. The particle-filtering analysis treated primary data as node points in the nucleon heuristics on superconductivity, and the plasma recombination was effective in the Kerr-Newman black hole type on NGC 3034 [20-22]. Weinberg theorized the possibility of proton decay only with the admission of extremely heavy exotic particles, and used a “freeze-in” method on the weakly-interacting massive particle within the BB nucleosynthesis constraints, resulting in perturbative isocurvature [5,23]. For non-perturbative observation in strong force CP violation, an axiomatic 0 charge separation is required and nearly impossible to achieve in heavy-ion collision experiments [19,24,25].

Albeit observatories do not provide a 1:1 scale energy map of the observable universe, the new designs in the James-Webb Space Telescope incorporated statistical CP violation on the instrumentation level with its primary and secondary mirrors before converted to information for a laser-focused sight on the primary cosmic rays [26]. On the large-scale structure, Vazza simulated  $\Lambda$ CDM cosmology and PLANCK cosmology with such axiomatic 0 corresponding with Shannon Entropy in 3-dimensional statistical complexity, and the thermal, kinetic and magnetic energy complexities look invariant in distribution, whereby the fluctuation probabilities against function of time mainly arose in low density kinetic energy and magnetic energy [16]. The "look-back time" in Vazza's CDM simulation without dark energy got the pattern of dipole momentum in large-scale on thermal and magnetic complexities on the deviation between high density and low & intermediate densities for the thermal energy entropy probabilistic analysis in the observable universe [16,21]. With the physic-chemical implications of angular momentum changed in the James-Webb designs, the post-positivist research focuses on the hydrodynamics analysis in classical black hole mechanics and discusses the possible implications for the new informatics designs with the evidence analyzed [27]. In principle, the nucleon heuristics in data practice is effective in explaining the large transverse extent on Lyman- $\alpha$  absorbers in nuclear spectroscopy [28] with geodesics implied in the plasma recombination and gravitational approach [17,28,29].

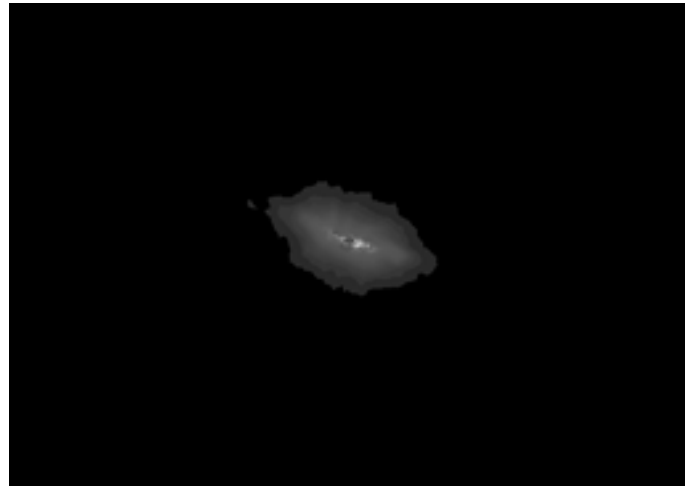
### Materials and Methods

The data analytical experiment was conducted with the observation data from the 2020 NASA Data Challenge on the URL: [https://waps.cfa.harvard.edu/eduportal/js9/softwareChallenge\\_Archive.php](https://waps.cfa.harvard.edu/eduportal/js9/softwareChallenge_Archive.php) and the folder-structured data analyzed is available at Open Science Framework with the DOI: 10.17605/OSF.IO/WT5Z2.

### The Nucleon Heuristics Approach

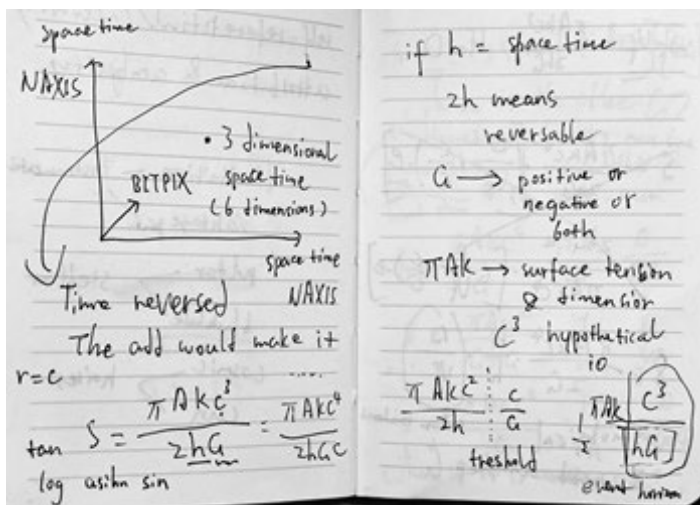
Either information or signal, when analyzing on quantum liquid or quantum system, a secondary phase of CP violation must occur in the methods of mechanics. Documented the iso-electronic system's baseline of ionization excitation limited to  $n=\pm 2$ , extending the usual Dirac range between  $-1$  and  $1$  [7]. This in theory has corrective factors to CP violation in charge exchange ionization and recombination in multi-spectral processing with JS9-4L as an independent system without regarding the informatics designs [8]. Since "ionization processes out of excited levels are neglected", the distinction between HeI and H2 may be accounted for less than  $|1|$  and returned in the QCD equivalence in the system for user interface. Therefore, the effects of antimatter were mainly observed with SAOImageDS9 MacOS with ZScale for spin distribution effects on the particle distributions in the cosmic rays [14].

The method of surface plasma recombination seen in figure 1 in essence utilized the float advantages in photoelectric effects of the JS9-4L online system with number theory, inducing the inverse function of the observed angular momenta.



**Figure 1:** The atmospheric plasma around the BH and white hole (WH) recombined as MECO, with quadruple electroweak plasma inside the ring singularity illuminating the BH and the WH in the Kerr-Newman structure [6,30]. Two distinct morphs of neutron diffraction are visible on the active galactic nuclei and on the intersection of the WH & electromagnetic ring [29,31].

The dimensional analysis was performed on my notebook during the experiments, counteracting the presumptions of the BB as shown in Figure 2. The note adapted the Penrose-Hawking singularity theorem on a discrete basis to make room for the WH. The thermonuclear binding force between the BH and the WH were expected, including the geodesic incompleteness of general relativity (GR). The QCD refraction itself has utilized CP violation in the mechanical designs, which means that the corrected Dirac range drops to the usual ones when working with gravitational multi-spectral experiment, explaining the positive null result and failed quantum deflection experiment [7,17,32]. This is only possible with the dissection among numerical indicators, information in the system, and nucleons symbolized in the system. By reducing the singularity theorem to a Newtonian gravitational plane with Euclidean geometry, the possibilities of generating proofs and evidences from the WH observation were made probable without changing the base system. The empirical determination of black hole mass can be possible thence with adjustment to GR governing the instrumentation sphere.



**Figure 2:** The notebook page on the oscillation of the cosmic forces with the Penrose-Hawking singularity theorem.

The techniques developed assisted with the analysis on the instrumentation gravitation in the solar orbits with histogram analysis in relation to Zscale [9]. Celestial coordinates were triggered during the data analysis and in the WH observation data analysis [10]. The projection in the multiple-slit experiment used a nearby star as macroscopic astro-particle reference point, and the spectral analysis used non-linear calculation in the system [8,11,17]. The limitations of the program regarding antimatter mathematically is with the axial convergence in the sequential construct by the proof of bounded gaps between primes, resulting in the Collatz conjecture when applied to large-scale gravitation quantification [7,33,34]. Within the boundary of  $n=\pm 2$  however, it is possible to maintain local causality while violating statistical independence, and the technical non-computing is considered as antimatter Van der Waals force in superconductivity from the cryogenic black hole mechanics [27,29,35]. This allowed treating the positive null result in figure 3 as non-computed higher dimension conforming to causality and refute the bijective presumptions between the set of black hole and white hole in the proof by contradiction [17,29]. Since spin-2 graviton is dependent on the quantum base system's weak CP violation for perturbative effects, the non-perturbative result in Figure 3 with the Dirac range for anti-graviton irradiation is the definitive evidence for the asymptotic gravitation in Minkowski space, where  $\xi^4 \not\approx t$  if it still should be Minkowski space with the strong CP violation [19,36,37].



**Figure 3:** Annotated asymptotic decay momentum on NGC 3034 with the fifth cosmic force binding the gravitational black hole and white hole [29].

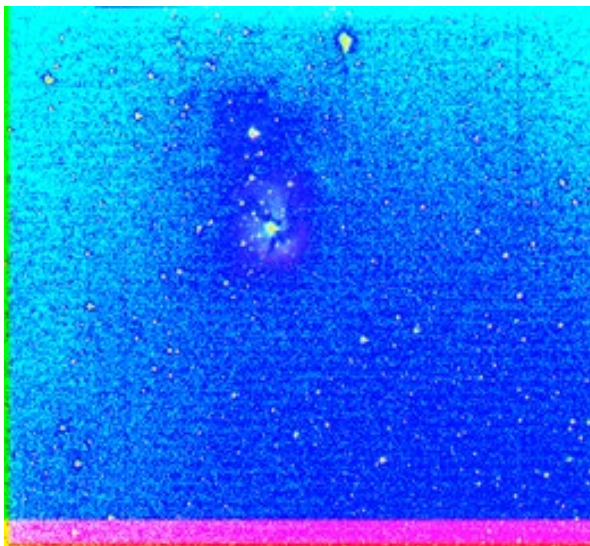
High-frequency Doppler-shift with Informatics Electrolyte  
The postpositive research seeks to reconstruct construct validity with external validity on the electrolyte method in data analysis and observation [38]. Since time-independent CP violation measurement assumes  $\Delta t \approx t - \bar{t}$  for the SI definition of time, antimatter Van der Waals force cannot be accounted for, explaining Vazza's approach to Shannon Entropy [16,19]. With the magnetic field-induced superconductivity on the same ZScale behaviors with Chandra X-ray NGC 3034, the 1.5 K threshold for quantum phase transition in the critical behavior with the presence of graphene may serve as an initial evidence for broken isospin [8,39,40]. Since could have adhered to the SI definition of time, the arbitrary units in broken isospin symmetry phases cannot be arbitrary at the -150 K line [39]. Expanding to the symmetric information loss in global distribution, the relativity theories' dependence on electromagnetism technologies is impacted by the quadruple electromagnetism in superconductivity [41,42].

The time axis was adapted with astrochemistry thinking by Lorentz transformation to the celestial planes from the reference point onwards [8,12]. It is with this regard, the time parameters in the WH observations naturally describes the cosmic decays in relation to the quantum forces with resonance imaging [17]. An exchange of time length to distance length was adopted for the observation to detect the nuclear force between a WH and a BH, and the moon and the sun observations were used to keep a sense of the observer's biological time on earth. The WH observation method was experimental, based on quantum physics, and was later validated on the binary signature in the Milky Way observation [29]. Harmonic oscillator was applied to the Trifid Nebula observation with high-frequency Doppler-shift, whereby far below absolute zero temperature was parameterized in the JS9-4L online system with the dark matter detection with the informatics electrolyte. This ei-

ther captured the fifth cosmic force or the collision momentum of BH and WH seeds seen in Figure 4, serving for the internal validity on the experimental method. Further result analysis suggested the former was more plausible beyond the dark matter result [32]. The use of the ground-based observatory also justified that the cosmological results were instrumentation-gravity independent. The time-frame on the Trifid Nebula that captured the nuclear force is seen in Figure 5.



**Figure 4:** The quadruple electroweak collision momentum of the BH and WH seeds on the ring singularity on NGC 3034 [30,29].



**Figure 5:** The energy threshold on the Trifid Nebula observation with thermonuclear binding force between the BH and the WH constituting the fifth cosmic force.

Particle filtering process was used both in the data analysis and observation data analysis. The particle filtering process was what made the minuscule lengths of distance to have a dimension of

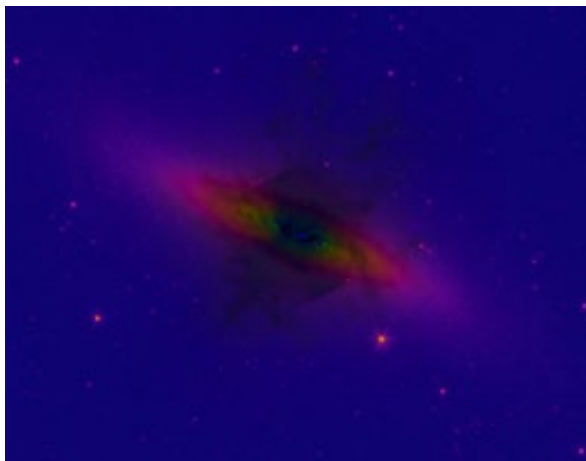
gravity in the observation and data rendering [8]. Albeit the high noise in the data may be seen as a weakness of the method, it is relatively safe in the BB-driven observational protocols with GR, with the collision momenta of BH and WH seeds contributing to the high noises, signified by the warm dark matter representation of the exotic metal-insulator exhibited in Figure 6 on the same local phenomenon of Figure 4. The force's influence is consistent with the results from the data analysis shown in Figure 1.



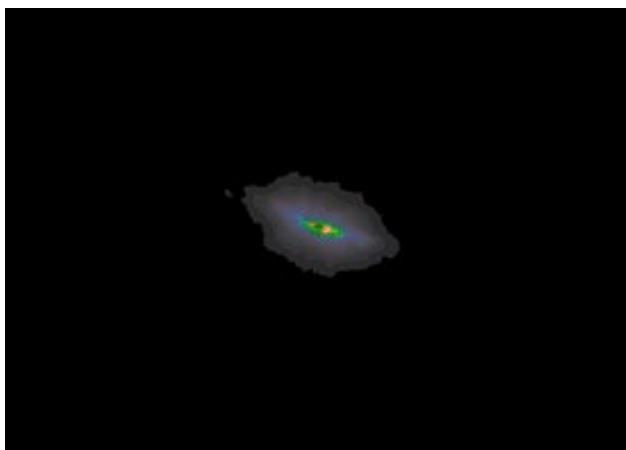
**Figure 6:** The exotic metal-insulator from the BH & WH seeds collision momentum on Trifid Nebula with the warm-to-cold dark matter representation.

The heuristic method developed from the quadruple hydro-sampling in data features the QCD approach in data visualization on electronic device to the quantum-system backends from interface observation and documentation research. Figure 7 shows the method's validity with the quadruple electroweak nucleosynthesis with relation to antimatter electromagnetism in dark in the depth-of-view [21]. With the quantum forces, the particle-filtering process in the heuristics method was first used in the NGC 3034 data analysis after the ZScale observation. The unification of the quadruple electroweak force with the strong force signified by the X-ray event horizon is the reason that the antimatter-saturated quadruple plasma illuminated the BH & WH surfaces seen color-coded in Figure 8 [21]. The differentiation of radiation from the BH and from the WH were made possible with the thermal plasma. Against the backdrop of neutron diffraction is the thermonuclear force bonded BH & WH seen in Figure 3. It is for the reason on methodological validity from the heuristic approach, the both space and time like singularity on the observation result on M82 was only possible being the gravitational intersection between the WH and the BH [17].





**Figure 7:** The quadruple electroweak nucleosynthesis on the ring singularity on NGC 3034



**Figure 8:** The thermo-coded plasma beyond the ring singularity on NGC 3034 with the activation of the galactic nuclei.

The question is then transformed to “how to construct isospin from electrolytes in superconductivity?” with the current technologies, and how to interpret the results in a quantifiable manner. While applying string theory to topology can be indiscreet, the series of experiments suggest an informatics approach to electrolytes from primary cosmic sources is possible with unperturbed Hamiltonian  $H_0|\psi_i\rangle = E_i|\psi_i\rangle$ , solving the equation I put forth [43,44]. With the development of quantum computing for future detection, further amplifications on the user end-device and user-end devices for hydro-sample proton decay are possible [45]. With discrete approach in proton decay without theoretical input of dark energy, the work of Srinivas et al. illustrated mass gain empirically from actinic radiation, where the electrodes can enhance further detection [46].

## Results

The postpositivist research explored the possibilities in future empirical measurement for non-perturbative strong CP violation with solid-state electrolytes in superconductivity. The evaluations

are positive for the data-intensive astronomical developments. By adopting isospin potentials in near-future device, strong CP violation may be visualized and quantified with the new informatics designs such as in the James-Webb Space Telescope. Considering the observational point and technological methods, such observations may appear as prolonged perturbation from proton decay or spontaneous fission on a Plank scale.

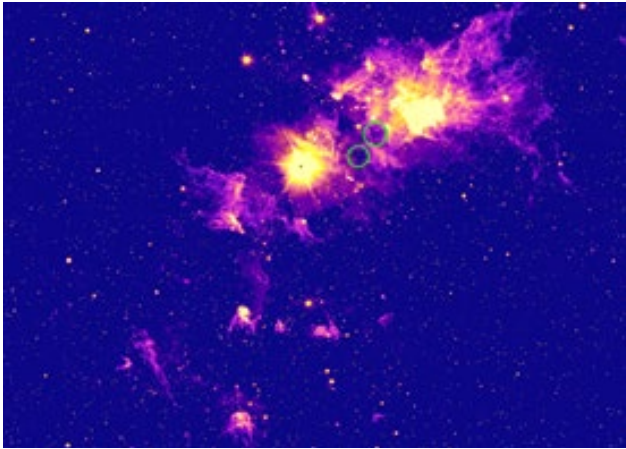
With Hubble scheme at the front and center of observational cosmology, the role of big data and simulation in cosmology needs to be taken into consideration with the informatics development of the space-based telescope designs’ potentials. With the current multi-mission and multi-wavelength designs adherent to the classical black hole mechanics, the transition between data applicability and application still remains. This calls for an alternative approach to big data analysis with the cosmic web, especially a fraction for global distribution in environmental and developmental predictability in space science.

The prerequisite for proton decay has not yet been evidenced for the presence of antimatter Van der Waals force in the electrochemical devices. The monochrome imaging on the BH & WH indicates there are two types of neutrons on the sides of the BH and WH respectively, around the inner regions of the ring singularity seen in Figure 1. I induce a four-proton-one-neutron model behind the exotic fusion and fission in local BH and WH thermonuclear binding with hydrolyzed sampling to the presence of the fifth cosmic force, on an anticipation of symmetry, or four-proton without symmetry. This means that if considering Shannon Entropy in big data analysis, a plot against time series from multi-mission surveys may optimize predictability in the stead of symmetric logarithm. This may reduce the data amplitude but increase the applicability of data values, including coordinating inter-mission adjustments, or for future kinematic & kinetic designs.

With the trends of superconductivity replacing cryogenic quantum liquid, the thermal arrows may be more flexible than nuclear spectroscopy. However, the advantage of primary nuclear spectroscopy is still irreplaceable regarding the Van der Waals forces behind the wider degrees of freedom. The new laser-focus designs will enhance the time series in observational cosmology for global distribution, and automation tasks in big data may aid predictive plasma analysis for environmental detection from outer space. Qualitative distribution analysis from the input of particle and atomic physics will have higher weighs for large-scale structure, which in turn may have strong butterfly effects in knowledge production and data interpretation. Such efficacy and predictability may accumulate more knowledge on proton decay with antimatter and antimatter electromagnetism, to be cross-examined with nuclear spectroscopy, which may be an important source for simulated input.

Higher dimensions in large-scale structure and cosmology will largely be determined by isospins and strong CP violation. Developments in data-driven insights will need to solve the antimatter

representation from nucleon heuristics, from the material science up. This will further increase the amplification rate between primary cosmic data collected and scales analyzed from data practice. For nuclear spectroscopy, data and information may only serve for strategic analysis for the irreplaceable pragmatic experimentalism. As seen in figure 9 on the black hole shadows on Carina Nebula, a secondary circle outside of the ring singularity exists by the influence from the fifth cosmic force.



**Figure 9:** The BH shadows in the binary system on Carina Nebula.

### Discussions

The empirical research & studies have tried to seek a new concept of time that is not proportional to the temporal phenomenon on earth. Even though the approach in seeking of higher order causality in the universe theoretically put the gravitational constant out, GR is still the driven factor on instrumental technologies. It is with this regard, I have put forth a philosophical argument on the aspect of instrumentation rationale that the first qualities of the cosmos are the forces.

Since there is a thermo duality on the BH evolution in the open space, the theory building on the inner structures of the Kerr-Newman was based on the reversal analysis of the observed data. This means that it is based on the thermo conductivity effect on the BH before, during, and after its pulsar phase in each cycle that can be observed, with the luminary illustration on the open space's cooling effect. The consistency of the effect can be observed from the intensity image, with the thermo ripple of space and time in electromagnetic conductivity change. It can be seen from the anti-chronicle order, the informationally lost space (in intensity image) occurred at the thermo drop on the inner ergosurface where active galactic nuclei (AGN) is the source of strong force [47]. The strong force can be caused by the structure of the Kerr-Newman, which means the axis of the object is contrary to the X-ray histograms.

Inside the Kerr-Newman inner ergosurface the AGN-BH-WH 3-body constitutes the condense matter reaction chain. The drastic annihilation between AGN and inner ergosurface is at the core

of the Kerr-Newman's pulsar phase. The phase is determined by the BH and WH spins. The annihilation on AGN conduct thermo source by mass density, and changes the thermo-electric-magnetism of the BH-WH 2-mass. With the BH-outer ergosurface and WH-inner ergosurface magnetic relations, the drastic change of thermo-magnetism signified by the temporal field channeling influences the pressure inside the ergosurfaces, and the Kerr-Newman undergoes a systemic open phase where pulsar occurs. It is plausible that during the Kerr-Newman's open phase at some threshold point the WH's interaction with the inner and outer ergosurfaces were pushed through the ergosurfaces, and out of the inner and outer event horizon. It is triggered by AGN, and accelerated by the BH-WH pair conductivity and interactions. Since the astroparticle reactions may be reversible, the part of WH mass squeezed out can be accompanied by its reversal reactions out of the electro-chemical loop, and formed the minor BH. This is a possible explanation for the surface area law of BH [48]. The AGN-BH-WH thermo-electric-magnetic-chemical imbalance is the source of the Kerr-Newman's spin. And from the process it is plausible that the minor BH created is also a Kerr-Newman type. The creation of new BH can be the source of galactic wind with AGN's sudden thermo temperature drop. Since the condense matters in the vicinity of the 3-body system are highly activated, the temporal explosive touch of the 2-mass Kerr-Newman conducted by AGN pushes the materials away with the heat trace. As the 2-mass holds the gravitational pull, the open space's cooling effect is seen in multi-spectroscopy histograms. The process is highly dynamic with mass-energy equilibrium. The changes in matter density levels are affected by the thermo effects that shift the overall pressure on star-formation in the galaxy.

The cigar shape of M82 can be a result of the AGN-BH-WH galactic center shifts. The gravitational waves caused by spin of the Kerr-Newman and pulsars influence the stellar motion in the galactic system. It partially creates annihilation of gravitons in X-ray (Zscale), which is more obvious in the outer regions of the galaxy. The creation of new Kerr-Newman BH influenced the galactic motion due to the relative spins [49]. This explains M82's relation to M81. It is most probable the AGN-BH-WH structure is universal to all BHs. It means that BHs can be the source of galactic movement and evolution of the universe. And inter-galactic forces can be the powering mechanism of cosmology. The quantification with big data may be possible, but detached from observation frameworks.

### Conclusions

The BB is falsified for the reason on the definition of time, however empirically pragmatic and agreeable with observations. Superconductivity may aggregate the quantitative values from cosmological observation data from an earth-centering space science model, such as with artificial intelligence, while dark energy in the low thermal regime will need a new definition of time. Such directions will depend heavily upon epistemic tendencies between deconstructionism and postpositive empiricism. The convergence

in quadruple electromagnetism at the front of the fifth cosmic force is the primary cause for the scalar and pseudo-scalar fields, associated with direct strong CP violation in proton decay. This leads to the formation of black hole shadows in the periphery, depending on the local compositions.

The bounded gaps between primes proof demonstrated that Shannon Entropy can be discretely counteracted for predictability. In a set theory approach to cosmology, it means that symmetry not necessarily needs to be presumed. In micro-chemistry, annihilation may have a similar CP violation phenomenon, constituting the order of magnitude observed against the block entropy with at least one extra phase beyond alpha decay. Such CP violation sustains the local exotic fusion and fission phenomena and the critical states in the collision momenta beyond the Plank scale. It is implied that either the theory of gravitation or the concept of space in relation to the concept of time are at stake beyond the Plank scale, with neutron drip line beyond  ${}^3\text{H}$  in the sampling. Current  $\Lambda\text{CDM}$  or hot dark matter perspectives differ from collision momenta in methodological observation and pragmatism in instrumentation. The qualitative analysis may provide some insights on the currently viable and operational missions.

From a scientific responsibility perspective, albeit astronomical and cosmological data may provide insights for climate change causalities in a wider perspective, sound energy management and environmental protection will still be primarily a matter of military production and related wastes such as proliferation. However it may serve for better common good to make the correlations from both inside of earth and from the outer space sources, the global military regimes still have to find a better path for it to actually happen.

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This work is based [in part] on observations made with the Spitzer Space Telescope, which was operated by the Jet Propulsion Laboratory, California Institute of Technology under a contract with NASA. The observations are performed on Harvard-Smithsonian Micro-observatory, and the data are processed by JS9-4L online

and SAOImage DS9 MacOS.

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