Einsteinian science versus the unified theory approach: A theory of the universe

Dong-Yih Bau

Department of Information Management, Da-Yeh University,
168 University Rd., Dacun, Changhua 51591, Taiwan, R.O.C.
E-mail: bau@mail.dyu.edu.tw

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Abstract: Recently, we defined two scientific discoveries using Einsteinian science: **the success/failure system** and **cosmic inertia.** In this **zenith** of our work on Einsteinian science, we demonstrate through two analyses that Einsteinian science is a complete science to a theory of the universe, which can approach the true picture of the universe. First, we analyse archive materials to reveal scientific events we term **Einstein's paradoxes between Einsteinian science and unified field theory.** Second, we analyse only two approaches to a theory of the universe: **Einsteinian science** and the **unified theory approach.** We demonstrate that Einsteinian science, philosophically and methodically, is a complete science, which contrasts with the Unified theory approach only practised in **physics** and mathematics and thus insufficient for a theory of the universe. Physicists face a potential turning point. Does Einsteinian science immediately arouse feelings and actions in physicists? Will Einstein's paradoxes between Einsteinian science and unified field theory persist in physics forever? **Science is still in its infancy in 2023, still as Einstein claimed in 1954!**

Keywords A theory of the universe, Deduction, Einsteinian science, Einstein's paradoxes, Induction, Reconciliation, The unified theory approach

1 Introduction

As **a free individual (1955–)** with a craving for uncovering the laws of nature, we (a polite expression for 'I' in academic writing) have uncovered two scientific discoveries,[1–16] **the success/failure system** and **cosmic inertia**, with Einsteinian science,[17,18] and explored their **increasing significance.** First, we showed that Einsteinian science combined with these two discoveries has the potential to change the outlook of science due to an understanding of two structures: the structures of the laws of nature[13,15] and of science.[14,15] Second, we successfully established an inter-realm reconciliation between religion and science through Einsteinian science with these two new discoveries.[16] Furthermore, we defined **the ultimate absurdity of science**, which is that the scientific community can never fathom Einsteinian science and science is stagnating.[16]

Third, in this paper, we will demonstrate that Einsteinian science, with these two new discoveries, is **a complete science for a theory of the universe,** and can thus approach the true picture of the universe. **Only one true empirical universe exists, and only Einsteinian science can successfully approach it.**

We perform two analyses. First, we conduct a historical analysis of **Einstein's paradoxes between Einsteinian science and unified field theory.**[17,18] **Einsteinian science**[1–18] refers to **Einstein's principle theory approach** to a theory of the universe. **Unified field theory**[17,18] belongs to the **unified theory approach,** which is the **current consensual practice** aimed at uncovering a theory of the universe in physics, such as **quantum gravity,**[19] **string theory,**[20] or **some other possibility.**[21] Indeed, Einsteinian science and the unified theory approach are the only two approaches to a theory of the universe.

Then, we analyse Einsteinian science[1–18] and the unified theory approach[19–22] based on the following three perspectives– **subject matter, method,** and **scientific progress.** In the process of analysis, we exalt Einsteinian science philosophically and methodically as a complete science and relegate the unified theory approach as non-empirical and pure mathematics rather than observable or experiential science**.** Our two scientific discoveries[1–16] and the principle theory approach[1–18] are key to demonstrating that Einsteinian science is a complete science suitable for developing a theory of the universe.

2 Einstein's paradoxes between Einsteinian science and unified field theory

Einstein's paradoxes between Einsteinian science[17,18] and Unified field theory[17,18] refer to historical events where Einstein proposed approaches of both Einsteinian science and unified field theory for a theory of the universe, whereas only one true picture of the universe exists. This is a **methodical paradox: two diametrically opposed methods for one universe.** (1) The reconciliation of induction and deduction vs (2) pure deduction as described in Sections 3 and 4. Thus, when one makes, the other will break.

Regarding Einsteinian science,[17,18] he wrote 'Principles of theoretical physics,"[18:220–223] in **1914,** remarking that the theory of relativity followed the principle theory approach. His **1918** 'Principles of research,'[18:224–227] and **1919** 'What is the theory of relativity,'[18:227–232] works specified the principle theory approach. In **1930**, he proposed the task of experiencing the universe as a single significant whole,[18:38] which inspired us to apply the principle theory approach to identify **cosmic inertia**[11] in **2021.** He also proposed, in **1931,** the task of being satisfied with the eternity of life,[18:11] from which we applied the principle theory approach to identify **the success/failure system**[1] in **2018.**

In **1933**, he wrote 'On the method of theoretical physics,'[18:270–276] with the refined concepts of the eternal antithesis between rationalism and empiricism and of experiences being the alpha and the omega of all our knowledge of the reality. He wrote 'Physics and reality'[18:290–323] in **1936**, discussing comprehensibility and the aims of science. In the last year of his life in **1955,** he said, "Look into nature, and then you will understand it better."[17:95] He said, "Physics is essentially an intuitive and concrete science. Mathematics is only a means for expressing the laws that govern phenomena,"[17:409] quoted by Solovine sometime later.

Regarding **unified field theory,**[17,18] Einstein said in **1923,** "In seeking an integrated theory, the intellect cannot rest contentedly with the assumption that there are two distinct fields, totally independent of each other by their nature."[17:378,379] This statement foretold Einstein's lifelong search for a unified field theory of gravity and electromagnetism. In **1929,** he said to Besso that he had completed unified field theory.[17:381] However, he had not. His writings on 'Physics and reality'[18:290–323] in **1936** and 'The fundaments of theoretical physics'[18:323–335] in **1940** reflected a unifying theoretical basis for all single sciences.

During **1948–1953,** Einstein examined his failure with unified field theory, saying, "I am still hampered by the same **mathematical difficulties** that have been making it impossible for me to confirm or refute my general relativistic field theory…"[17:401] in **1948;** "The unified field theory has been put into retirement…mostly because physicists have little understanding of **logical-philosophical arguments.**"[17:404] in **1951;** and "There are no methods of affirming anything with respect to solutions that do not yield to the peculiarities of such **a complicated nonlinear system of equations**."[17:405] In **2007**, Isaacson said, "To the very end [in **1955**], he struggled to find his elusive unified field theory."[23:543]

In hindsight, Einstein spent fruitless efforts on unified field theory instead of Einsteinian science. This is an **application paradox, the misuse of time on an irrelevant method.** Yet still, physicists work on the unified theory approach to a theory of the universe[19–22] with a limited understanding of Einsteinian science.[17,18] Thus, the application paradox continues to exist today.

A few words about the laws of nature:[15] From the principle theory approach, Newtonian science considers only forces as the laws of nature, while Einsteinian science aims to uncover **all** the laws of nature. The success/failure system and cosmic inertia can only be uncovered by Einsteinian science. They are non-force laws of nature.

3 Einsteinian science for a theory of the universe

Based on the principle theory approach[17,18] and our two scientific discoveries,[1–16,] we begin to analyse Einsteinian science to demonstrate its completeness. In this approach, the three analytical perspectives – subject matter, method, and scientific progress – are, respectively, **the empirical universe, overcoming the antithesis between rationalism and empiricism** and **scientific advancement.**

To obtain an understanding of something in the universe, there are two schools of philosophy:[24:24] **empiricism** and **rationalism.** Empiricists maintain that all knowledge is derived from experience, whereas rationalists claim there is certain knowledge that is derived from reason and logic and which we know independently of experience.

In this regard, Einstein methodically referred to deduction and induction, saying in **1953,** "Development of Western science is based on two great achievements: the invention of the formal logical system (in Euclidean geometry) by the Greek philosophers, and the discovery of the possibility of finding causal relationships by

systematic experiment (during the Renaissance)."[17:405]

Seeking a theory of the universe is not the same as disciplinary research regarding rationalism and empiricism. The principle theory approach philosophically overcomes **the antithesis between rationalism and empiricism**[18:271] and is the only relevant and rigorous method to a theory of the universe, as shown later.

3.1 The empirical universe

The subject matter of a theory of the universe is certainly the empirical universe, which is the totality of existence that is constant. We live on Earth, in the Milky galaxy, in the universe. Everything exists as a part of the universe. **Physicists can only empirically approach the universe.**

Einstein had a successful experience in defining **general relativity** for understanding **the macrocosmos** of the empirical universe. Einsteinian science adopts **the eternal-universe philosophy,** as he said, "Out yonder there was this huge world, which exists independently of us human beings and which stands before us like **a great, eternal riddle.**"[17:338] He posited that the universe has a pre-established harmony, saying, "The most incomprehensible thing about the universe is that it is comprehensible."[17:423]

He proposed to experience **the universe as a single significant whole,**[18:38] which has nothing acting on it and thus is autonomous. Therefore, the empirical universe has a clear boundary. A theory of the universe is a well-defined (scientific) problem. The task remains to use the principle theory approach to successfully uncover the law of nature governing the universe as a single significant whole. This will uncover the only true picture of the universe.

3.2 Overcoming the antithesis between rationalism and empiricism

Regarding a theory of the universe, Einstein said, "The truly great advances in our understanding of nature originated in a way almost diametrically opposed to induction."[17:367,368] That is, we can only use deduction, not induction. However, the subject matter is the empirical universe. Thus, there must be a deductive system that is dependent on the empirical world. The principle theory approach philosophically overcomes the antithesis between rationalism and empiricism,[18:271] thus methodically reconciling deduction and induction (in Western science),[17:405] by establishing a scientific axiomatic system.[3,4] The successful application of the principle theory

approach guarantees the discovery of the laws of nature.

While Euclidean geometry, a mathematical axiomatic system, has self-evident axioms, the principle theory approach that builds scientific axiomatic systems demands more:[3,4] axioms must be connected to the empirical world outside the axiomatic system; new laws of nature are the products (theorems) of the scientific axiomatic system. The scientific axiomatic system of true **applied mathematics** is **what Einstein meant by applying mathematics to science.**

The laws of nature, as derived from scientific axiomatic systems, have **intrinsic (scientific) symmetry.**[13] What the laws of nature express can be experienced empirically and understood with symmetry-based logic, i.e. purely through logical argument and without reference to particulars.[13] **We may say that scientific symmetry is the nature of the laws of nature.** Thus, the laws of nature have the properties of "supreme purity, clarity, and certainty." said Einstein, signifying objectivity.[13]

One can uncover a law of nature either (1) by building a scientific axiomatic system to obtain it or (2) by directly building the scientific symmetry if only one has competence. We elucidate the method and the laws of nature through the success/failure system and cosmic inertia, the two excellent, profound, simple cases used to teach Einsteinian science. Physicists must be humble to learn how to uncover the laws of nature themselves. Physicists may refer to an application of our two discoveries in reconciling religion and science based on cosmic inertia, the success/failure system, and an empirical law called **the homo-ecosystem** on Earth that is derived from the success/failure system.[16]

Case 1: We build a scientific axiomatic system to uncover the success/failure system principle for the mesocosmos, the level of our existence in the universe, to address the eternity of life,[18:11] a mystery that interested Einstein.

We see and experience an order in the universe:[12] At the level of our existence, there can be failures in the universe, which makes it *an erring universe.* To reveal the hidden connections of sense impressions in their totality, based on a sympathetic understanding of experience, we create minimum general concepts**,** such as *success*, *failure*, *part*, and *whole*, giving sense to 'A part succeeds,' 'A part fails,' 'The whole succeeds,' and 'The whole fails.' Then, we reveal the relations between these concepts. This uncovers ***a general fact:*** if something (the whole) depends on another thing (a part) for its *conditions for success,* then it depends on that thing for its *causes of failure,* and

vice versa. We have just discovered two dependency relations for *conditions for success* and *causes of failure* over the *part-whole* relation.

To account for the complexities of sense experiences and the hidden success/failure connections of sense impressions in their totality, we require the part-whole relation to be a one-to-many relation, such that the whole depends on one or many parts. We also allow a succession of part-whole relations *ad infinitum,* which forms a partial ordering structure (PO). Therefore, the dependency relation of the conditions for success has the properties of reflexivity, anti-symmetry, and transitivity, as does the dependency relation of the causes of failure. Based on the above analysis, we rationally know the order in the erring universe, as reflected in the logical structure of the universe at this mesocosmic level.

By considering this general fact, which reflects such mathematical concepts as the dependency relations of the *conditions for success* and the *causes of failure* and requires discrete mathematical reasoning, as an axiom, we developed a hypothetico-deductive system to obtain the success/failure system principle, which is a theorem to account for the complexities of sense experiences and the hidden success/failure connections of sense impressions in their totality. The success/failure system principle[1,3,12] is formulated as

$$\mathbf{PO}_{\text{conditions for success}} = \mathbf{PO}_{\text{causes of failure.}}$$

This can be read as "in the part-whole structure of a success/failure system at the mesocosmic level, there exists a partial ordering for the dependency relation of the conditions for success, which is symmetric with the causes of failure."[13] This formula highlights the mathematical symmetry between the conditions for success and the causes of failure. Most importantly, the success/failure system reveals the mesocosmos empirically and, with symmetry-based logic, obtains scientific symmetry. The success/failure system is a genuine law of nature on the scale of the universe.

Case 2: We directly build the scientific symmetry to uncover cosmic inertia for the case of the universe as a single significant whole.[11] To overcome the antithesis between empiricism and rationalism, principle theory begins with a sensed order on the scale of the universe. About fourteen billion years ago, the Big Bang, where the universe was exploding, occurred, and the universe is still expanding today, according to Hubble's indirect observations in 1929. Empirically and with symmetry-based logic (empirically and logically), what exactly was exploding and is now still expanding?

The foremost law of nature in mathematics, $E = mc^2$, gives an answer of mass and energy, clearly revealing the logical structure of the universe as a single significant whole. Specifically, the totality of the mass-energy of the universe in time series is a cosmic constant denoted as α, signifying its highest importance among the cosmic constants. As the empirical universe evolves, this totality of mass-energy distributes, redistributes, and transforms while maintaining its overall quantity.

The next question is whether our empirical universe is expanding indefinitely or is an oscillating universe (i.e., an endlessly expanding and contracting universe).[11] Einstein said, "The world of phenomena uniquely determines the theoretical system."[18:226;3] Thus, intuitively, we start by saying that[10] if the universe is expanding indefinitely, the totality of mass-energy must be mathematically infinite. Since the totality of mass-energy must be finite, our universe must be an oscillating universe.

Thus, the universe exploded after a Big Bang (when the universe had its smallest volume) and has since been radially expanding its space progressively across time slowly until it will eventually stop, reverse itself, and radially contract its space rapidly until it suddenly stops again. Then, there will be another Big Bang, and the universe will cycle forever. Since principle theory successfully builds the logical structure of the universe as a single significant whole, which completely represents, orders, and surveys the world of sense **empirically and with symmetry-based logic,** this ends the proof.

Einstein said, "What a deep conviction of the rationality of the universe and what a yearning to understand."[18:39] We consider the question: Why did the Big Bang happen? We intuitively suppose that, as gravity itself cannot account for the Big Bang or an oscillating universe and as there is only one universe, it was due to (*the principle of) cosmic inertia*.

Then, we verify whether a single consistent logical system can still be guaranteed by principle theory when cosmic inertia is assumed. Since we consider the universe as a single significant whole, that is, the system in its largest context, the universe has nothing acting on itself. Thus, *by definition,* the universe is governed by cosmic inertia. How the universe works due to cosmic inertia has been described previously: an endless cycle of decelerated expansion followed by accelerated contraction. Science methodically discovers that the universe causes itself and is governed by gravity superimposed on cosmic inertia, which remains a single consistent logical system by principle theory. **Newton's first law** was mistakenly defined without an awareness of **cosmic inertia (an oscillating universe)** and its relation to **gravity (a moving**

universe). Nature (the universe) is a great eternal riddle.

In conclusion, by feeling the universe as a single, significant, whole, oscillating universe, we discovered **cosmic inertia,** which expresses the distribution, redistribution, and transformation of mass-energy across time and space while maintaining its overall quantity: **a theory of everything.**[11-15] Since the terms *a theory of everything* and *cosmic inertia* refer to the same theory of the universe as a single significant whole, we may use them interchangeably in this paper. Cosmic inertia, a theory of everything is formulated as the following complete scientific symmetry**:**[11–15]

E = mc^2 and the constant of nature **α,** expressing the totality of mass and energy.

3.3 Scientific advancement

We uncovered the only true picture of the empirical universe by successfully identifying cosmic inertia, a theory of everything that governs the universe as a single significant whole. We defined **the past universe, the present universe,** and **the future universe,** respectively, as the early universe, including the Big Bang, the expanding universe, and the contracting universe, in (one cycle in) an oscillating universe.[10,11] At the present universe, we know that general relativity governs the macrocosmos, i.e., a moving universe; the success/failure system governs the mesocosmos, i.e., an erring universe; and quantum mechanics governs the microcosmos or the atomic structure, i.e., a jiggling universe. Thus, we may uncover other new laws of nature governing the future universe and the past universe at these different levels of the universe.

Cosmic inertia provides a basic understanding of the universe as a single significant whole. The more the laws of nature are uncovered, the truer the picture of the empirical universe becomes, and the more comprehensive becomes our theory of the universe.[15,16]

4 The unified theory approach to a theory of the universe

Now that we know only one true empirical universe exists and only Einsteinian science can successfully approach it, we know that the unified theory approach[19–22] must fail both methodically and in practice. For example, in practice, Einstein's unified field theory failed;[17,18] the incompatibility of general relativity and quantum mechanics persists,[19,20] let alone the incompatibility among general relativity, quantum mechanics, and the success/failure system.[8]

To effectively analyse the unified theory approach[19–22], we philosophically and methodically analyse it without delving into mathematical details**.** We use a "philosophical or methodical concept" of Einsteinian science to choose an opposing concept for the unified theory approach. For example, the term *a unified theory* is opposed to the term *the empirical universe.* Thus, in this approach, the three analytical perspectives – subject matter, method, and scientific progress – are **a unified theory, separating rationalism from empiricism and scientific stagnation.**

The **subject matter** of the unified theory approach[19–22] for a theory of the universe is **a unified theory.** The subject matter of a unified theory is not the universe per se but the things to be unified. For example, although general relativity and quantum mechanics are incompatible, the unified theory approach[19–22] attempts to integrate them into one theory rather than develop a theory of the universe. As the unified theory approach[19–22] has proposed many unified theories, its subject matter[19–22] is a unified theory itself, and it does not have a clear boundary. The unified theory approach does not address a well-defined problem.

The method of the unified theory approach[19–22] separates rationalism from empiricism instead of overcoming the antithesis between rationalism and empiricism with Einsteinian science. Thus, the unified theory approach[19–22] adopts a mathematical axiomatic system that is independent of the empirical world and begins with self-evident truths.

For example, in a unified theory of general relativity and quantum mechanics,[19–20] one may begin with general relativity and quantum mechanics as axioms and develop a unified theory. In this unified theory, general relativity and quantum mechanics play the role of axioms but not of theorems with Einsteinian science. Thus, they have lost their original meanings of the laws of nature in the empirical universe and have become merely non-empirical concepts and relations as self-evident truths in mathematics. All physicists who are blind to Einsteinian science cannot realise this situation associated with the subtle methodical difference between science and mathematics. **Science demands more than mathematics** as to the **inter-method reconciliation of deduction and induction** versus **pure deduction.**

Physicists working under the unified theory approach[19–22] tend to favour beautiful mathematical theories, praising mathematics with **"the unreasonable effectiveness of mathematics"**[19] and are against philosophy, denigrating philosophy with **"the unreasonable ineffectiveness of philosophy."**[19] They like to use symmetries and

super-symmetries[19–22] that are **mathematical symmetries,** not necessarily **scientific symmetries.**

As the unified theory approach[19–22] proceeds independently of the empirical world, it ignores the **Big Bang** and **an expanding universe** and thus does consider theorising them. Furthermore, without the concept of **scientific symmetry,** it has no reason to challenge the logical absurdity of a seemingly accelerating expanding universe.

On the other hand, in practice, a mathematical axiomatic system used in the unified theory approach can surprisingly deduce what the empirical universe may look like: a **multiverse,**[19,20] **a holographic universe,**[22] or **some other possibility.**[21] Mathematics should not have this ability. What unreasonable effectiveness mathematics has!

Unification is the terrain of physicists' free will. One may feel drawn to integrate the Riemann hypothesis with quantum gravity. Another may exaggerate their work on specific subject matters or celestial bodies[21] like black holes, white holes, and wormholes to be a theory of the universe. Indeed, a chaotic diversity of mathematical geniuses' creativity, perhaps including wild guesses! Physicists work on anything but the universe! Worse yet, they may not realise this situation.

Thus, the scientific progress of the unified theory approach is, we would say, scientific stagnation! The unified theory approach leads nowhere. Worse yet, humanity is penetrated by a variety of erroneous theories of the universe, all competing to be the most popular rather than the truest.

5 Conclusions

We conclude this pinnacle of **our work on Einsteinian science** in the following sequence: **the problem of science**, **the solution to the problem of science,** and **our contributions to the problem and solution.** We **now** briefly describe **the origin of our work on Einsteinian science.**

No 1: Regarding a theory of the universe, all physicists are wrong, and they are no longer scientists, which indeed deserves the term 'the problem of science.' They specifically use **unified field theory**[17,18] and generally use the **unified theory approach,**[19–22] which is a theory of **mathematics** rather than **science.** They build **mathematical axiomatic systems,** rather than **scientific axiomatic systems,** freely using and publishing cold physical concepts and relations that are irrelevant to

uncovering any empirical truths or the laws of nature**.** The unified theory approach prevents physicists from seeking new laws of nature, including cosmic inertia, which governs the true picture of the universe. Thus, science is stagnating (at least during **1923–2023)**! **The unified theory approach**[19–22] **is pure mathematics, not (theoretical) science. Pure mathematics is not cosmic.**

The solution to the problem of science is Einsteinian science.[17,18] Einsteinian science adopts **the eternal-universe philosophy,** where the empirical existence of the universe is **compatible with** the logical existence of an eternal God in Western religious traditions. We believe we can only build a theory of the universe for the true picture of the universe by adopting the eternal-universe philosophy. Furthermore, Einsteinian science attempts to philosophically overcome **the antithesis between rationalism and empiricism** and methodically reconcile **deduction and induction (in Western science)** by building **scientific axiomatic systems,** which are the basis of **science.** Einsteinian science is the only relevant and rigorous philosophy and method for pursuing a theory of the universe.

Through **our two scientific discoveries** of the success/failure system and cosmic inertia, **our historical analysis** of Einstein's paradoxes between Einsteinian science and unified field theory, and **our analyses of Einsteinian science and the unified theory approach,** we have made contributions to solving the problem of science in its current state. We wholeheartedly invite the community of physicists to methodically change from the unified theory approach to Einsteinian science regarding a theory of the universe and to transform science in the twenty-first century.

O**ur destined journey in Einsteinian science** began **alone** twenty years ago in **2003** when a colleague posed the following question: **Why was Einstein more intelligent than an ape?** Twenty years later, in **2023,** we claim that (1) Einstein was (and is) more intelligent than other physicists due to **Einsteinian science,** and (2) we are the first who understand and apply Einsteinian science. As **a free individual,** what truly liberates us with great joy and scientific merit is that we can be and have been emancipated from this **intelligent puzzle** after twenty years' preoccupation, puzzling, and gradual enlightenment.

However, we end this article with an **intelligent paradox:** Today's physicists may consider themselves **more intelligent than Einstein,** they do not like Einsteinian science, and they detest the true picture of the universe for various reasons. Thus, **Einsteinian science** will remain for all time **a beautiful memory in the universe!**

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