

Who Will be the Next Albert Einstein?

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Abstract

Even Einstein will have a hard time answering the question posed above but perhaps History can. Will history repeat itself? If it does, can we guess who might be the next Albert Einstein? When Einstein made his startling discovery of unifying Maxwell Theory and Newton's Theory, he was an unknown and struggling physicist. A solitary investigator of nature. Will the next great unifier will be like Albert Einstein, who, as of today, is still unknown to the Physics world? In this study, we enumerate the scientific climate during the time of Einstein and some historical facts about him before his famous "*Annus Mirabilis*" and relate it to whom might possibly be the next Einstein who will discover the next great unification. We also consider the famous cliché that, any bright high school student who stumble upon Einstein's two Special Relativity postulates and happens to know advance high school algebra will inevitably discover Einstein's Theory. Here, we consider on how can any bright college student who happens to know the postulates of General Theory of Relativity can generalized it with little knowledge on advance college Calculus and how it will inevitably lead in finding the next great Unification Theory in Physics.

KEYWORDS: Einstein, Unification Theory

Introduction

In this study, our premise is that: *History repeats itself but with a little modifications*. There is a little modification since the time of Einstein at the turn of the 20th century is very different in today's world of Internet and iphones of the 21st century. Here, we will enumerate one by one the scientific climate during the time of Einstein before the consecutive months of 1905 when he published his ground-breaking works. With some historical facts about him, we will attempt to predict what would also be the scenario for the next Albert Einstein. Lastly, we outline how a bright college student with little knowledge of advance college Calculus can even have his own Unification Theory.

The Next Albert Einstein

Who is Albert Einstein before the publication of his works? Can we be guided by history in knowing who will be the next Albert Einstein? Here are some points to ponder:

I. Einstein has no university affiliation and was struggling to find one.

He has a doctorate degree but he ended up as a patent clerk in Swiss Patent Office. He was literally unknown to the Physics world. The next Albert Einstein would probably has a university affiliation

but it is probably an unknown university making him also unknown to the Physics world. Still, a struggling physicist working for his ground-breaking research to be heard or read by everyone.

II. There is no preprint server during the time of Einstein.

Newton publish his work in a book, Einstein in a journal, the next Einstein would probably publish his work in a preprint server like the great Russian mathematician Grisha Perelman when he published his proof on Poincare's Conjecture. But since he is literally unknown to the Physics World and affiliated to an unknown university, by all means the next Einstein will try his best to get an endorsement to anyone who probably did not know him in order for him to publish his work in a famous preprint server. Since there is always the possibility that he and his works will be ignored and even questioned, he will probably not get any endorsement. The worst case scenario would be, he really knows no one who can actually endorse his work. In the end, he probably ended up posting his work in a very open preprint server mostly ridiculed by the Physics community. No offense meant of course to any unpopular preprint server but he may also considers publishing his groundbreaking paper in a well-known social networking site for scientists just to get some respectable readership for his work. This is of course after all his effort for his work to be published in any respectable peer-reviewed journals. However, there is always the possibility that he might not consider publishing his work in any peer-reviewed journal. This is perhaps after some initial rejections for his work by some arrogant reviewer or perhaps being afraid for his work to be scooped by others or plagiarized by some famous editor who is affiliated in some world famous university. If ever his work will be published in whatever platform or medium it might be, one crucial thing with this analogy is: If Einstein waited for years for his works to be recognized, perhaps the next Albert Einstein will probably have to wait for decades for his work to be appreciated and developed by the Physics community.

III. A recent mathematical revolution happened years before Einstein came

Riemann rocked the very foundation of Geometry. He solve one of the greatest mathematical problems during his time—the problem of Euclid's Fifth Postulate. Then, Reimannian Differential Geometry flourished few years before Einstein enters in the scene and single-handedly reinterpret it. The next Albert Einstein will probably well-aware on the latest revolution in Mathematics. The next Einstein would probably used the famous Ricci Flow of Hamilton [1] that is recently used in 2002 by Perelman [2],[3] to prove one of the mathematics greatest problem in our time—the Poincare's Conjencture. As of this time, the Ricci Flow and Perelman's approach is flourishing and continuously being developed. Physicists should developed more the connection of Ricci Flow with Einstein's General Theory of Relativity and its possible use for Physics.

IV. Before 1905, a great unification in Physics recently achieved experimental confirmation

Maxwell's Theory was the great unification theory during the time of Einstein. It unifies Optics, Electricity and Magnetism. Hertz in his series of experiments made an astounding confirmation. Thermodynamics was also unified by Boltzmann and Maxwell with Newton's Theory and the Industrial Revolution confirms it. The next Albert Einstein probably also heard the news about the discovery of Higgs-like particle in 2012. Its discovery is considered by many as a final confirmation of the Standard Model that unifies the three forces in nature namely: the Electromagnetic (EM) force, Weak force and the Strong Force. It seems that CERN Revolution made it again since the time it made an astounding confirmation in early 1980s of Electroweak Theory that unifies EM force and Weak force.

V. In Einstein's time, many thought that Newton's theory can explain everything.

Because of Newton's theory, physicists during the time of Einstein devised the mysterious and luminiferous "aether" that said to permeates everything. It was considered as the stuff where light propagates. It was also considered to explain how charges physically and mechanically interact. Lorentz even attempt to explain the null result of Michelson–Morley experiment by thinking that the interaction of matter with aether is the cause of the observed length contraction. The next Einstein would probably fed up on the idea that Quantum Theory can explain everything i.e., he probably will not subscribe to the idea that all Unification Theory should be based on "Quantum Theory". He probably abhor the idea of "atomicity" of everything. This will make him a crackpot to everyone in the Physics community who likes to make everything "quantized" because his approach is in direct opposition with all the mainstream Unification Theories. His goal is not to "tear apart" the thing that makes up the Universe like space-time but simply to extend Einstein's beautiful concept of "bending" space-time. The next Albert Einstein simply wanted to elevate Einstein's work from Differential Geometry to Differential Topology. With such simple-minded goal, a lot of so-called *loopholes* will be thrown at him and he will probably get a *strings* of criticisms from the establishment. But in the end, the next Albert Einstein and his theory will survived the onslaught.

VI. Einstein was greatly influenced by Ernst Mach in his formulation of his theory.

Einstein was definitely "Machian" that made him irreverent to any orthodoxy. He read a lot of Mach's books which serve during his time as the dissenting voice against the establishment. Mach's criticisms to Newton's Theory made such confidence to Einstein for him to question the most fundamental basis of Newton's Theory. The next Albert Einstein would probably a "Bellian". He probably read a lot of Bell's paper from its well-known compilation called "Speakable and Unspeakable in Quantum Mechanics". The great British physicist John Bell is the epitome of the dissenting voice from a lot of physicists who are discontented with Quantum Theory. So the next Albert Einstein is probably a realist just like Einstein, de Broglie, Bohm among others that see Quantum Theory to be an incomplete theory. He definitely still doubting if the framework of Quantum Field Theory will lead us to the long awaited holy grail of Physics. His readings to all of Bell's work will gave him the confidence he needed to question the prevailing idea that Quantum Theory and its framework being considered by many as fundamental structures by which any Unification Theory must be based. He probably maintain the idea that Quantum Theory just like Einstein theory are semi-fundamental theories that can be unified in a more Fundamental Theory. Because he is a "Bellian", he will probably take note of the fact that the physical interpretation of Quantum Theory, one of the greatest theories in the history of Science, is not only vague, but scandalously unknown. So in the end, the next Einstein will probably start with Relativity with its clear physical interpretation and thinking always that Einstein's ideas will ultimately lead him in solving the greatest problem in Physics.

VII. When Einstein discovered Relativity all he needed is just an advance high school algebra.

A famous cliché is that, any bright high school student who stumble upon Einstein's two Special Relativity postulates and happens to know advance high school algebra will inevitably discover Einstein's Theory. The next Einstein in his formulation of his Unification Theory, would probably need just an advance college Calculus. The logic of this, is the fact that since the next Albert Einstein, will be starting with General Relativity, what he can do is simply to advance further the mathematics used by Einstein. Thus, the next Einstein will probably modify first the mathematics in Einstein's work that uses Differential Geometry. The most logical way for such modification is to elevate Einstein General Theory of Relativity from Differential Geometry to Differential Topology. We suggested here that perhaps an alternative way for the next Albert Einstein to generalize General Theory of Rela-

tivity is by using the most famous mathematical tool in Differential Topology today—the Ricci Flow. He will probably developed a kind of a Conformal Gravity Theory which is not necessarily a "Unified Field Theory" as envision by Einstein and find a way to relate such theory with Quantum Mechanics. One way to do it is to consider the suggestion of Wheeler [14] that: At Planck Scale, curvature (the gravitational field) might arise as a kind of "averaging" over very complicated topological phenomena at very small scales, the so-called "spacetime foam". Thus, the next Albert Einstein will probably consider the recent work on Deformed Special Relativity (DSR) that modifies Relativity at Planck Scale [15],[16],[17],[18],[19],[20],[21],[22],[23]. The theory he will developed would probabably achieve some of the merits of the mainstream unification theories but not necessarily using some of its esoteric mathematics. Also, the next Albert Einstein will always consider the criticism of Misner et.al.[13] that the mathematics of General Relativity is incompatible with the mathematical formulation of Quantum Mechanics . The hardest part of it however is which formalism of Quantum Mechanics he must consider as there are probabably a dozen legitimate quantum formalisms. In my own guess, he will probably start with the basic in which the physical interpretation is clear.

Summary and Conclusion

We have argued here that the next Albert Einstein must introduced a new approach by which the mathematical tools used in Quantum Mechanics and General Theory of Relativity must be unified in *a way that was never been used in the past* and the two theories become emergent or derivatives of a more Fundamental Theory. The mathematical formalism he might used may not be so beautiful at first glance and even considered "trivial" but it will most likely cleared us with too much abstraction and too much of formality that it will paved the way for a better physical interpretation of Quantum Mechanics and further generalization (or extension) of General Theory of Relativity. The path that the next Albert Einstein will probably take is a long and winding road as it is totally different from what was already considered in the past but one must remember that the next Albert Einstein will probably adhere to the admonition of the great John Bell who said:

The longer road sometimes gives more familiarity with the country.

And finally, the Unification Theory that the next Albert Einstein will proposed is probably at the Planck Scale, as already suspected by others, but in a way that is unfamiliar to everyone. It may even just a simple one compare to other Unification Theories that uses esoteric mathematics and superfluous assumptions since the next Einstein constantly reminds himself of the admonition of one of the greatest physicists that inspired him from the very beginning of his solitary investigation of Nature:

Everything must be simple but not simpler.

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