Non-Trivial Axioms, Norms, Scales, Symmetries of Physical Laws with Selected Writings

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Abstract: If we're standing on the shoulders of the giants then it could mean that either we have to seek alternative to blindfold nature in making our discoveries or we still have to proceed with the accepted norms also the former certainly means violations. Notes, explanations, logics and principles being the discoverable and indiscoverable of physical laws are interpreted and analyzed here.

Relativity ; Quantum Worlds ; Superstring Theory ; Unifications - GUT ; Sagan-Kardashev Scales ; TOE

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Discussions and Methodologies:

[1st. Topics of Interest]   Anthropic Principle: Universe makes sense to them who are aware of her existence

[2nd. Topics of Interest]   Pushing the boundaries: Complexity of physical laws in unification

[3rd. Topics of Interest]   Abstract and no reliance on experiments: Mathematics leads the way

[4th. Topics of Interest]   Scales and invariance: General relativity and quantum theory

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[7th. Topics of Interest]   Causality and dependability: Orthodox rules the world and it's not always good though

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[9th. Topics of Interest]   Sagan-Kardashev scales: P vs. NP - Will artificial intelligence answer our questions

[10th. Topics of Interest]   Relativistic notions: The thrust of learning and hunger for knowledge

[11th. Topics of Interest]   Decisions, conclusions and summaries: To know is to know as a conjecture not as a proof

[12th. Topics of Interest]   Threshold capacity of knowledge and equality with God: We're certainly far below than God's and we would never reach his level

[13th. Topics of Interest]   Musings from the 5th dimensions: Selected writings with a carol

Any suggestions or any missing references or any other logical questions relating to this paper are appreciated and can be asked on itsdeep@live.com mentioning the name of this paper at the subject line. This would be highly welcomed and appreciated. This being a preliminary draft (ver. 1) contains typos, errors and would be rectified later times. However, every effort have been made to make the errors as minimum as possible, still there can be. So, if mailed to me addressing this, I would be more than happy to rectify them. One particular image is shared to me from my network, and other images which are there, appears everywhere throughout the net, hence citing a particular reference is difficult. This also can be extended to data in writings section.

Definitions:

Non-trivial – Those which proves to be of immense significance in constructing the mathematics associated with physical laws thereby making it possible to reflect the less important trivial properties being distinguished and separated from them.

Axioms – The fundamental postulates that are true and will be true irrespective of changes in any physical laws provided the nature of that laws complies with the structure over which that axioms are constructed upon.

Norms – The related properties, upon which the effects of any specified physical laws are parameterized, perturbed and interpreted.

Scales – The degrees of measurements which either constant as invariant or varies as variant related to those norms when it comes to distinguish the micro, macro and in-betweens.

Symmetries – The notions of keeping something structured with some reference as to preserve it or in other case to break it depending upon the space, time and vacuas to be constructed along the way of theories.

Maximum and minimum:

10^{500} is the maximum given possibility for any instances to happen or exist at the dimensions.

2 is the minimum limit to be considered upon as proposed by the principles of supersymmetry with +1 cancelling out -1 or vice versa.

A single mathematical formula in enough to make comparative and deductive analogy with critical reasoning of each aspect described above:

Heisenberg's Uncertainty Principle – $\Delta U^1 \times \Delta U^2 \geq \frac{\hbar}{2}$
$where,\ U^1 \times U^2 \neq U^2 \times U^1,\ U^1 \Rightarrow Parameter\ 1, U^2 \Rightarrow$
$Parameter\ 2,\ \hbar = \frac{h}{2\pi}.$

Explanations – Measurement of variable U^1 would lead to a wrong measurement of variable U^2 and measurement of variable U^2 would lead to a wrong measurement of variable U^1 which in the Heisenberg's original formulations treated as non-commutable but here I have re-specified this into the analogy of being scale variance that is, not being there to suffice the measurements between micro and macro as regards to invariance thus portraying the scale difference between, rather typically a huge scale mismatch between general theory of relativity and quantum mechanics.

Symmetries being concerned as – Symmetry, supersymmetry (SUSY), symmetry breaking, supersymmetry breaking.

Dimensions – 10 spatial + 1 temporal as in M-theory, 10 spatial + 2 temporal as in F-theory. Further complexity is not required in this paper. Scales of dimensions wheather being compactified, large or small as regards to extra dimensional nature apart from 3 spatial + 1 temporal is not appropriate for the analogy being taken here.

Fundamental Forces – Electromagnetism (photons), strong nuclear (Gluons), weak nuclear ($\beta - decay$), gravitation (Graviton: spin 2, mass 0, obeying Bose-Einstein statistics – SUSY formalisms: Gravitino: Spin 3/2, mass $\gtrsim 0$ obeying Fermi-Dirac statistics.

Scale Mismatch – Gravitation being $\sim 10^{20}$ orders of magnitude smaller than the weak nuclear force results in "Hierarchy problem of particle physics". Solutions stated: RS-1 and RS-2 models with flows between Planck – TeV Branes.

Lie Group Analogy:

$\left((U(1) \otimes SU(2) \otimes SU(3)) \subset SU(5) \subset SO(10) \subset E(8)\right)$ without gravitational forces.

Anthropic Principle
Universe makes sense to them who are aware of her existence

If consciousness is a subset of cognition, then philosophy is also the subset of physics; thus in a way these two are interrelated, not just from the perspectives of physics but to the whole aspects of physical laws, intertwined – interrelated – interwoven all through the matters of space through time both in visible and invisible norms. Defining philosophy as a mere source of analytical reasoning being deduced through perspectives of thinking is just a mere fallacy in our ideological evolutions. In the coherent perspectives of macro and micro, philosophy can tune up with mathematics giving birth to physics. Thus, going back a few centuries ago, physicists were termed as natural philosophers.

Summing up the consciousness in this way, its perhaps the Rene Descartes who first acclaimed the mind-body relationship through geometrical presentations. This, when evolved in the approaches of the human-animals analogy, then notions of the level – 3 consciousness being prominat through 3P's normalizing the evaluations of human minds far greater weighting than every creatures of this majestically crafted earth (*noted: if not we take into considerations of other life – harboring extra - solar planets*). Defining 3P's is,

$$3P's = \begin{cases} Prediction^{0-1} \\ Preparation^{1-2} \\ Perception^{2-3} \end{cases}$$

Relative weight : $\langle 0 - 1 \gg 1 - 2 \gg 2 - 3 \rangle \rightarrow$ Prediction being the first to come which leads to preparation thus arising the normality of perception.

This is more than enough to clarify the relative reflections of human minds as associated to level – 3 consciousness (*note: not considering any specific scale as each is related to different interpretations*). *Hitherto* with this: humans are the only species in planet earth who are capable of thinking their positions in this universe, they can think themselves as an entity existing in this particular dimensions thus perceiving space-time with the notion that there is more to find in this large unknown void of 97×10^{12} *light yrs. wide diameter* (*excluding the unobservable parts*).

If we think of a fish who is living in a tank, or perhaps in a ocean, *does that capable of assuming their existence in this ocean let alone be this cosmos?* Sufficing the negative to the question, that fish is totally unaware of its existence and universe is not unfolding herself to them; in other word universe is not existent according to them; universe is nothing – as they are incapable of calculating their existential coordinates relative to the universe.

Thus universe would make sense to them; only them who are capable of making themselves aware of their positions in this P – Branes (P here is 3).

Conjugative approaches of consciousness with existence gives birth to the most significant assessment for the development of these transitive physical laws; *our universe.*

Einstein spent his last 10 yrs. of his life in a futile effort of a unified theory. But, the quantum physics getting solidified slowly with the almost accurate relativistic principles, Einstein couldn't come up with any approaches for a unification schemes. This, mainly because; the most inflammatory methods of mathematical physics is still there to come up from the brains of brilliant minds. Almost every physicists; starting from very earlier when the idea is getting generated vaguely in the minds of physicists to the most modern ones, Veneziano's amplitude, Nambu – Goto actions, Calabi and Yau's conjectures, ideas are getting in shapes as to perceive the reality through a higher order dimensions with a much greater degrees of freedoms. Kaluza – Klein's analogy is there with the conjugation of gravity (*here: momentum*) with electromagnetism in the 5th dimensions, there are still much more to account considering the laws of unification schemes.

Starting with the Bosnonic string theory with the later addition of Fermions through supersymmetries, the 2nd string revolution is a benchmark in interrelating the 5 string theories with the 11 – dimensional SUGRA (*as; supersymmetric gravity or supergravity*). The dualities being expressed are the T (Topological) and S (Strong – Weak) dualities. The 5 +1 theories with 10 + 1 (*s + t*) dimensions are,

- Type I
- Type II – A
- Type II – B
- Heterotic SO (32)
- Heterotic (E8 × E8)
- And 11 – dimensional SUGRA
- *+ extensions of strings as P – Branes residing in the Bulk with Cyclic* (*ekpyrotic cosmological models*)

Higher order dimensions being developed to reduce the coupling strengths but being hard to produce the necessary kinetic energy for bombardments, supersymmetry is a dream for every string theorists as this could only open the door of a concrete analogy for the existence of strings.

IR – UV models could then get in the way of reasoning between *Quark – Gluon Plasma with Planck mass*.

Abstract and no reliance on experiments
Mathematics leads the way

Questioning the properties of physical laws, *aka, nature* has always been there with the human thinking but the inflictions and rogue questioning are getting in the way through the progression of human civilizations through time in this space.

Asking questions with a much weighted leverage starts along the incubation of the coherent resources of quantum mechanics with relativistic norms. Humans have not totally aware of the fact that *the more deeper questions being asked – the more stringent the nature becomes.* This stringency perhaps come from the fact that, nature could in no way reveal her secrets to satisfy the inquisitive and hungry quench of human minds that they are reflecting through imaginations.

Thus, experiments could be made only when something is being discovered with a parallel to any experiments supporting them, providing the existence and establishing the ground for the theories being hypothesized, conjectured, and developed.

When questions are getting intensified, its answers are naturally getting harder to comprehend, proclaiming the way of doing stuffs too harsh to believe. This abstractness is through the way of leading the inability to perform experiments; as what is beyond our capacity to comprehend, *how can we put that into machines for some outputs?*

Experiments can only be performed through materials and analogies with proper physical, analytical, critical, deductive and most importantly reasonable reasoning that can in some way be justified within the current machines (*as per the current technological scales*).

When the directions being arrowed to metaphysics with a high touch of futurisms; *then the only tool that could make some sense to human thinking – is the mathematics.* Implementing norms through imaginative approaches and getting them experiments are far in this scope of futuristic physics.

When nothing helps – then mathematics leads the away! Mathematics developed 100 years ago or more are getting proven today through measurements, observations and experiments. Thus whatever is there with us today, we have the most proficient tools to justify them in paper; the mathematics. *Who knows that with the further evolutions of technologies there could in principle opens up a way for performing an experiment summing up the ideas from all these present day mathematics in some 100 yrs. or more in future?*

Scales and invariance
General relativity and quantum theory

Macro perspectives been aligned with general relativity, it always in some way or other ignores the quantum part but *does it in essence?* God might be playing dice – 'might' I just added apart from it; its remarked by Einstein sarcastically for targeting quantum mechanics! Thus, the dice always being in a probability of falling through 1/6, its happening that God wont want such confusions. The richness of this remark although being portrayed in other ways, still; quantum world is a probability with something always tends to be existent in one place or the other, who would have thought that those superposition concord the mechanics of computing in a new approach via QBITS!

Quantum universe is for tiny beings, some tiny while others too tiny to be of Planck's scales where the constants itself are getting reduced to unitary for making sense. Proportions having a relative frames considering the references from one giant cosmic objects to others; probability paved the way of keeping physicists hooked in the quantum domains! Perhaps due to this strange but true quotes have born – *Nobody understands quantum mechanics – those who are saying that they understood quantum mechanics haven't understood at all! – nothing makes sense in this quantum universe!*

That's being more than affirmative, makes perfect sense in their own ways departing hugely from each other's – *quantum mechanics and general relativity*! And this is killing the minds of today's physicists. The notions of making the two theories scale invariant.

Just like GR can't be easily scaled down from large to tiny, same as QM can't be scaled up from tiny to large. Thus forbidding physics to attain a TOE (theory of everything unifying all the 4 – fundamental forces of nature).

There are ways and places in the universe where both of the theories are playing their role in a conjugated way. And that portion is infinite! If might not make sense that why the congruence point of GR and QM be infinite (*or infinitesimal – varies*). Taking the Einstein – Hilbert actions, from loop – (2) onwards in $\Gamma_{k \mapsto \infty}^{(2)}$ momentum while goes to infinity, large scale corrections are required as the theory is tending to be *Ultraviolet!*

Renormalization approaches are getting in terms by $\Lambda - cut\,off$ schemes where the divergences are gruesome to take into account.

Making the two theories scale invariant is the most signifying and prudent approaches the physicists have had taken and that's *the origin of all the troubles in physics!*

Like a hero, string theory moves forward to tackle this matter; norms are getting generated accompanied by computations and rigorous analogies with mathematics. Still string theory is an incomplete theory but who knows that at some point of distant time this invariance in scales would pave the way to solidify the notions of TOE!
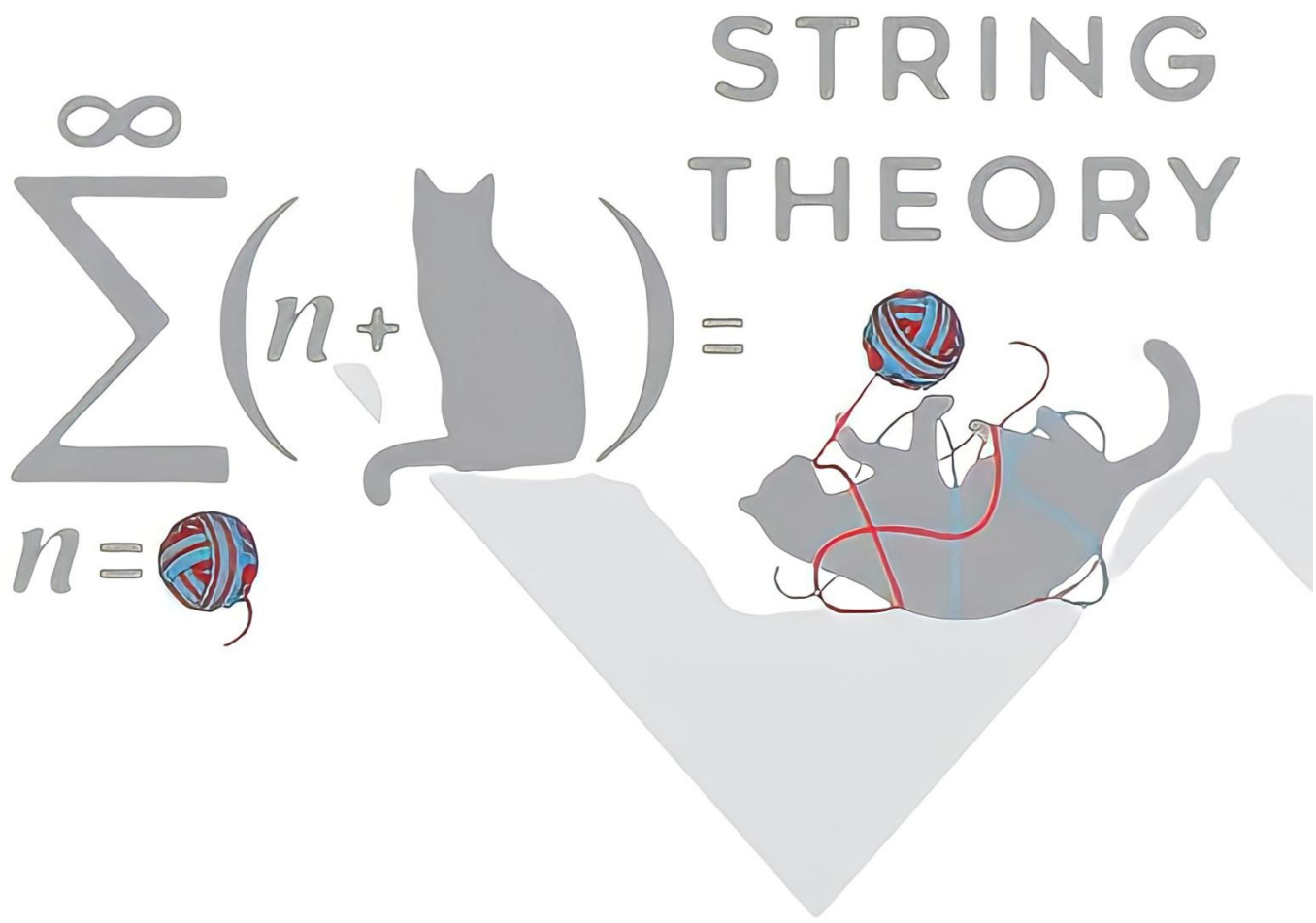
String Theory x Schrodinger's Cat – *Credit: SnorgTees (background altered)*

Enigma of Higher dimensions
Being pervasive is being leaking

Strings could be extended to higher dimensional objects called P – Branes where P stands for the number of dimensions, that Brane is made up of. It should be noted that any Branes which are there must be embedded in a Bulk. Boundary conditions being a crucial factors related to the Brane – String analogy where its mathematically satisfied, the end – points of strings could in principle rest in those Branes. Not all strings have end – points. Strings to be classified as:

- Open strings – They have their end points on the Branes.
- Closed strings – They being a closed band won't have any end points to rest on the Branes.
- Infinitely stretched open strings – They are the D-1 Branes, quite heavier with one end there over any Branes but the other end is infinitely stretched away; so long that its impossible to comprehend what's there at those end points – thus not being known and concreting the fact of being that end without any rest points on Branes, they behave as *magnetic monopoles.*

As the standard model of particle physics exists on the P – Branes (P being 3), gravity as being not a part of it, they are closed strings freely floating from Branes of one dimensions to other dimensions. This can be best expressed by the analogy of the 2 – boundary conditions imposed in this scenarios: Dirichlet and Newmann boundary conditions. Gravity (*or specifically graviton of spin (2), mass (0)*) being a closed strings or bands has no such end points to rest on Branes, thus they're free and pervasive capable of making the *inter – dimensional travels*. Thus, graviton would be the best candidate to communicate our messages to some arbitrary entities living beyond the ($s + t = 3 + 1$) dimensional world.

Thus gravity being constant leaking in higher dimensional worlds, we find the force of gravity to be weaker around $\sim 10^{20}$ orders of magnitude than the weak nuclear force (responsible for $\beta - decays$). This gives rise to the famous *hierarchy problem* of particle physics.

Photons are the open strings and hence are stuck in our 4 (3-s + 1-t) dimensional world. They just couldn't escape our P – Branes (P = 3 here) and are there taking place in all the interactions of Electron – Position, QED through the *fine structure constant*, i.e. 1/137.

Now, its safe to say that *Why its so difficult to detect gravitons?* Because as soon as they got produced, they quickly leaks awy or escapes to the higher dimensional world.

Branes even plays a crucial part in the cyclic (*ekpyrotic cosmology*), where the *radon fields* between two Branes (two here is the number of parallel Branes and not any specific dimensions; dimensions can be any provided they're ≥ 10 without considering any specific domains of superstring theories. That field weakens or strengthens leading to the movement of those two Branes and when they collides then the *bang* gives birth to a new universe and then those Branes moved away apart from each other whereupon they again comes closer and strikes gain making another *bang*. Thus the cyclic cosmological notion been established.

Type II-B is a good theory fulfilling its own way of becoming both Topological and Strong – Weak dual to itself, thus got emerged to a new form in F – Theory where the space – time dimensions are being ($s + t = 10 + 2$). This 2 – time dimensions increases the mutual degrees of freedoms making the theory more fulfilling. And Type II-B contains both open and closed strings, the closed being the graviton is there in this theory.

Mathematical garbage or mathematical beauty
The quest for learning what humans are not meant to

Over-complexity of physical laws needed for unifications. And that won't come from any easy computations. Rigorously computed calculations encompassing variety domains of mathematics can only help us in achieving the results. And those results are not at all in any way measurable or proved through experiments. Some theories are too advanced to implement technologically; thus those best remains in papers and softwares.

Norms required are so much abstract to formulate the computations supporting those claims and hypothesis of physicists that even mathematics that are existent now; proved incompetent in some cases where the requirement of new mathematics arises, waiting to be discovered. But, how would those be discoverable? As,

- Algorithm needs to be developed to extend the present mathematics in a further goal-oriented approach implementing through machines.
- Few domains of mathematics needs to be amalgamated to produce something more rigorous, more logical, more prominent, more explainable to attack, exploit and conquer those hidden mysteries of this universe.
- Sometimes, some old conjectures could be proven which ultimately finds the way to get involved, implemented deducing the results of the strangeness of this vast and hidden coordinates of this physical nature.

Things fell under destructive criticisms as and when *few physicists* raise their voices against the practical implementation of those mathematics through experiments. This is arguably true that *human minds can only be satisfied by viable results* rather than strange yet practical computations. Then voices rose as if this can't be discovered or can't be seen by our eyes; this isn't in any way could be true? Is that all that suffices to be a logical conclusions? - abstractness can only be seen when something gets far beyond the normal perceivable notions let alone be visualizations! Thus, seeking the entities responsible for the strangeness of natures, there could be nothing as the place of making experiments!

Humans throughout the history first observes or what can't be observed imagined seeking the faint hints of any effects produced by those unseen. Then, they develop theory, chalks out calculations, implements deductions, normalize it, try to get rid of unwanted material by refining it, making it looking logical to arrive at some conclusions being suitable for performing experiments, making the ground for something existent through the human civilizations without any destructive criticisms (*here, few exceptions are not considered to make the approach simple and analytical*).

Now, its quite illogical to think that humans could go after any theories or hypothesized something, then performs an experiment to demonstrate it in front of his peers eyes. Nature is not so simple as considered in higher-physics. *The more the questioning of human mind penetrates into the heart of physical laws – the more the nature shows her stringencies* forbidding us to find the eternal mysteries being the creation, existence and parallelisms.

Thus, this thinking should be normalized that, *not everything that is going on in the minds of a physicist could be seen in laboratory*! No. there are stuffs that can't be seen now, perhaps might be possible to perform an experiments based on them in some distant futures when humans have developed much that what they are today in terms of tools, technologies and evolution of thinking capacities. Like, theories and mathematics that have been given centuries ago; even beyond that are now getting observed in nature or being performed in laboratory. As stuffs couldn't be proved won't in anyway mean that they're wrong! They can be wrong but future generations will tell that, now, let the theories and mathematics be safe with physicists without any destructive criticisms. *Who can tell that doing mathematics to find solutions of A might lead to find solutions of B in far future where B proved more valuable than A?*

Causality and dependability
Orthodox rules the world and its not always good though

Teleological evidence suggests that effect could in principle be there before cause and this has been proven now. The timing anomaly between the apparent and absolute horizons of a black hole in Finkelstein coordinates which consuming a passing by stars is justifiable perfectly. Also, the quantum eraser experiments and the resultant wave – particle dualities as seen from those experiments can in effect support the teleological evidence or evolutions. Thus, causality in principle can be inverted, given proper physical scenarios with related approaches.

Dependability could always not be there in causal approaches – like the effect is dependable over the temporal and spatial evolutions of the related cause, thus arising the *first: cause, then: effect* thoughts. Dependability is also there in the difficulty of welcoming the new ideas giving intense support to the old pillars, showing ways after ways to keep the old pillars alive. This in particular is necessary throughout the application of physical laws, hence *universality would be lost.* Resulting, in the popping up of theories absurd in both logics and ideologies. But, that in any way, doesn't imply – we shouldn't welcome new ideas sometimes seeing its prudency. New thinking can in principle be achieve via three ways,

- Modifying the old idea into a new one.
- Rejecting the old idea and replacing it by a new one taking some portions of that old idea.
- Developing an approach completely new to the whole scientific communities.

Einstein when came up with his revolutionary thinking of the relative notions of space and time, although those two are conjugated by Herman Minkowski later on. Scientific communities at that time were fully dependable of the rigid and absolute notions of space with *time as an one way arrow* which too is at the fixed pace, let alone be there any concepts to contract or expand the pace of temporal dimensions. Shattering the almost 200 years old idea, Einstein faced difficulties and protests as at that time physicist were not yet ready to overcome from the absolute norms and welcoming the relative norms. The world according to Newton is a stage where everything on it are actors playing their role in the fixed flow of time.

Now, we can imagine that if Einstein wouldn't come up with the relativistic notions of space-times, then not only the universe would stay rigid but also every discovery would be frozen in the eternal flows of time. Now, theories of Einstein and their vast solutions from other physicists along with modified theories, are coming up in flying colors in every observations and experiments.

Going back to the reasoning of the previous topic – as its not possible for Einstein or his followers to prove every theory of him, notably, various aspects of general relativity: like time dilation, black holes, cosmological evolutions and many more, this probably concreted the grounds of the critics to go against his theory. But, some was definitely proven like the bending of light rays by Eddington via Mercury's perihelion.

Apart from relativity, Einstein – Podolsky – Rosen provided the 'EPR' paradox and Einstein himself refereed it as *'spooky action at a distance'* – the phenomenology of quantum entanglement.

HUNDERT AUTOREN GEGEN EINSTEIN

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'One Hundred Authors Against Einstein' was published in 1931. When asked to comment on this denunciation of relativity by so many scientists, Einstein replied that to defeat relativity one did not need the word of 100 scientists, just one fact. (*Text courtesy: Britannica*).

Blindfolding the nature
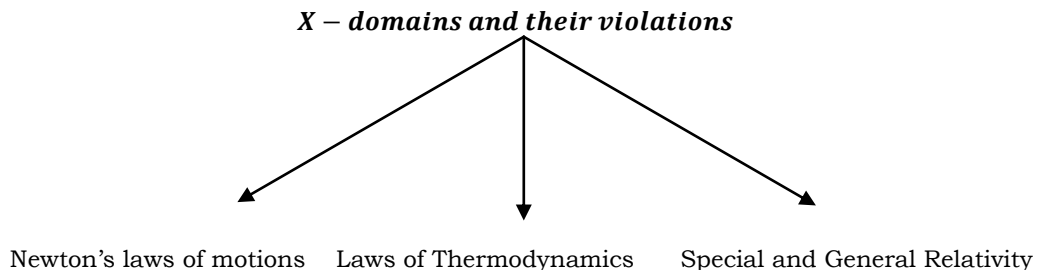*Seeking alternatively with experiments from past and theories of present*

In this section I will try my best to draw some classifications of physics based on the different properties of physical laws they are going on with. The surprising fact is that, there will be two such topics which almost no one has ever heard of. This is due to the fact of orthodoxy and stubbornness of scientific minds to acknowledge and interpret them. if the topics are going smooth with violating the known laws, then that is the solidified physics. And if things which are not in any way obeying those known laws, then they are seen by experts (*almost every-one's!*) as conspiracy theories. Those stuffs got the burden of falling under the victim of conspiracy theories because – although every calculations are there alongside theories but they are ill-mannered and making no perfect sense in describing the physical laws. This being the victim – the entire blame could be given to the scientific community where they are not paying any head to make them properly explainable with mathematics. So, grouping them into Y – domains and X – domains; let's chalk out the very first differences.

$$Domain\ wise\ classifiers = \begin{cases} Y - domains, & \text{The known theories that tends to be both} \\ & \text{experimental as well as theoretical with the} \\ & \text{modern ones relying heavily in theories} \\ & \text{alongside prudent explanations.} \\ X - domains, & \text{Ill defined theories and mostly unknown,} \\ & \text{cencored and classified with the excellent} \\ & \text{experimental demonstrations.} \end{cases}$$

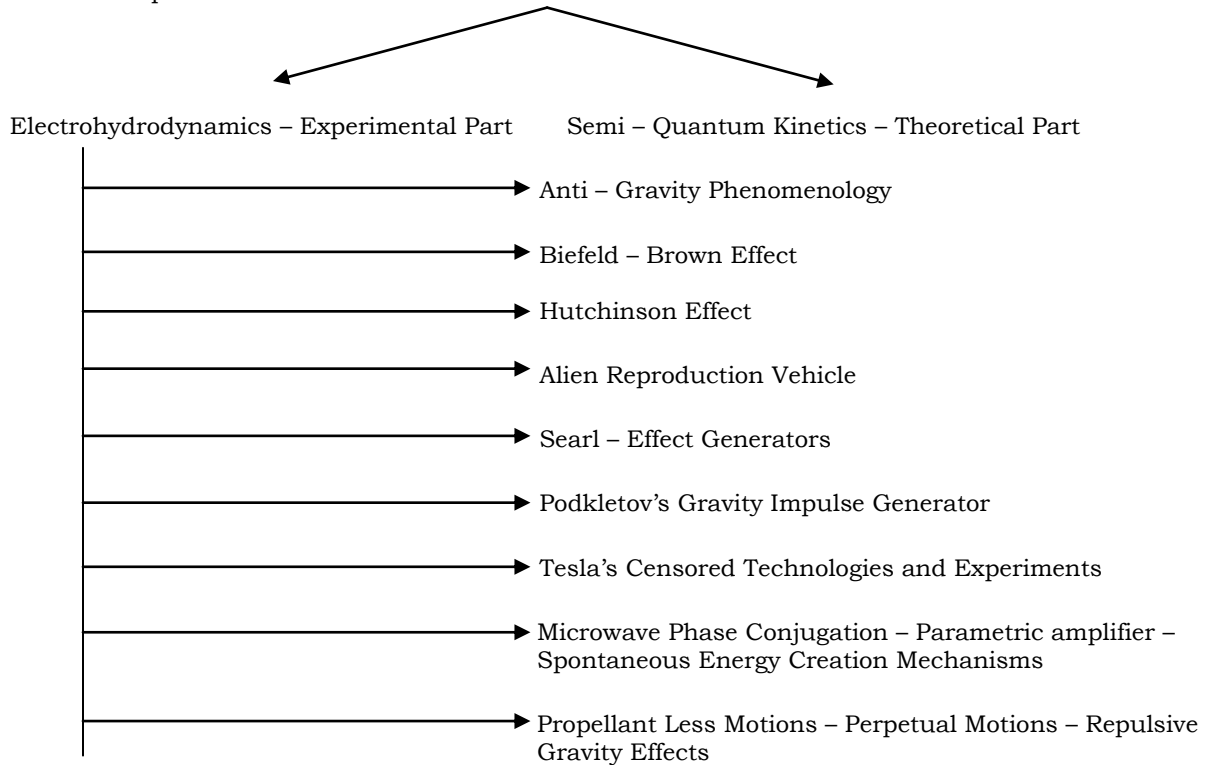| $Y - domains$	$X - domains$
Mathematical	Electrohydrodynamics
Theoretical	Semi-Quantum Kinetics
Experimental	Combinations
Observational	
Computational	
Different combinations of the above branches	

$Y - domains$ – Every known laws of physics are considered here with few exceptions, that too being properly explained, considered in academias and research works.

$X - domains$ – Violates the known laws of physics, although experimentally concrete but neither further extrapolations are made from both being theories as well as experiments, censored and classified, treated as conspiracy theories (*some-times pseudoscience*) and not considered in any academic purposes.

$X - domains\ and\ their\ violations$

Newton's laws of motions   Laws of Thermodynamics   Special and General Relativity

As I have already mentioned that nature gets very stringent in her cores which prohibits the researchers to get to know the working properties of the inner and hidden physical laws, *blindfolding* concept comes from the fact that, perhaps nature is aware of her laws and constraints, thus if those theories that are not complying with the physical laws of nature, rather in a way to violate them – if approached to find the inner workings, nature won't be able to distinguish those laws which would perhaps seem aliens to the natures mind, thus nature can be easily *blindfolded*, whereupon those theories bypass the natures mind, then returning to us with the reveling every aspects of the inner workings of the nature.

X – domains mostly contains censored works, classified technologies, experiments, findings kept hidden from publics, patients patented by researchers, interviews, exchange of secret letters to colleagues, staffs of those who are involved in developing the theories and experiments.

Electrohydrodynamics – Experimental Part   Semi – Quantum Kinetics – Theoretical Part

Anti – Gravity Phenomenology

Biefeld – Brown Effect

Hutchinson Effect

Alien Reproduction Vehicle

Searl – Effect Generators

Podkletov's Gravity Impulse Generator

Tesla's Censored Technologies and Experiments

Microwave Phase Conjugation – Parametric amplifier – Spontaneous Energy Creation Mechanisms

Propellant Less Motions – Perpetual Motions – Repulsive Gravity Effects

Sagan-Kardashev scales
P vs. NP - Will artificial intelligence answer our questions

Parting with the nature; thus being existent in this mother Earth, humans should try their best to escape from the 6th mass extinctions. Though being said, things are different when looked from the viewpoints of how much humans are capable of developing their technologies to pave the way for being an intelligent creature on this universe. Life is there or not, is a question of debate, paradox with the ultimate reasoning that, even if intelligent lifes are there somewhere in this universe – Then also, as long as we are able to witness them, no theory, mathematical formulations are sufficient to come into any conclusions.

Now, almost all of readers would question their mind that – Why there is P vs. NP and artificial intelligence in the middle of discussions of a scales that parameterize the growth of a civilization. Scaling is of utmost interest in every bits of studies as moving through scaling senses the notion; that where we are standing right now in this majestic cosmos, thus, simply; we could in a way understand out weight in this universe. Thus comes the Sagan – Kardashev scales which models the present weights into 3 possible categories depending on their development and progress as concerned with the relation to physical laws. The formula could be stated as,

$$K = \frac{\log_{10} P - 6}{10}$$

With,

K being the Kardashev rating of the civilization.
P is the power being used in Watts.

Our civilizations value is 0.73 using ~18 Terra Watt of power than standing between Type – 0 and Type – 1 civilizations. Initial studies have classified the potential levels of the civilizations into III – scales,
- Planetary or Type – I civilization capable of harnessing all the available powers of the planet.
- Stellar or Type – II civilization which are capable of using the energies of the solar system.
- Galactic or Type – III civilization capable of using the energy of the host universe.

Thus, us being there in 0.73 still need to move through a long way for achieving the ultimate levels of the growth and advancement. Some physicists have shown us to extend that scale to 4 or even 5. Thus, its very normal to expect – If we try to find proofs of all conjectures – Hence making everything works and raises our scales faster and faster. This is not going to happen. As if we go back to 300 years before – in 1700; then we will see how much we have progressed, the same thing humans from 2300 would notice if they peered back in time. The time required to reach each successive scales are,
- Type – I: ~300 years.
- Type – II: ~1000 years.
- Type – III: ~10,000 years.

Considering the advancement of processing powers with the ability of computers to slowly moving in terms of, say, a large faction though, but still in that faction of human thinking – The artificial intelligence is carrying on its tasks.

Calculations and computations are getting easy with the advent of incorporating quantum mechanics in computer science, where Q-BITS are being used with Up – Down spin configurations to store memories analogues to 1 – 0 ways. Thus, superposition being an essence of quantum mechanics, calculating times are moving shorter with difficult ones become less challenging to compute.

Still the biggest hindrance that the machines are facing – The inability to perform tasks that are incrementing exponentially rather than in a non-exponential or polynomial way. And the solutions of Polynomial vs. Non – Polynomial (P vs. NP) would bring a paradigm shift in the computational changes.

Staying concerned with the fact that if we solved most of the problems on how to tackle things exponentially by going over nested loops and treating them in some clever tricks for the accomplishment of any tasks, we should have to see that whether or not the dependability of a machine to give orders to do any work exists or not.

Although AI is still in its infancy but a point would come in the future where they would grow into so much of a computational proficiency that they could dream. They could neglect human orders. They could make more advanced machines along with their programming by their own, this leading to the doorway for hiding a singularity. Things that could happen as,

- Just like we humans although evolved through chimps are no w caging chimps, making them tools for our studies- forgetting the fact that they once used to be our ancestors.
- Hitting of a singularity or seed singularity, perhaps the technological singularity where intelligence are exploding from machines to machines – Caging us humans; forgetting the fact the concept of AI are from humans and without humans they couldn't be, what they have achieved.

Just as every good thing comes at an expense which is opposite to that is called good, AI just won't come with any expenses; as such to destroy or caged the human species. Thus, needs have arises to see whether we humans can in any way divert the AI flow from the hard singularity, bypassing it and goes to a soft singularity by means of error – approximation terms as I have showed in this paper of Mine.

Related References:

Bhattacharjee, D., & Roy, S. S. (2021). Uncontrolled mutation of super-intelligent machines may lead to the destruction of humanity. IEEE TechRxiv.
https://doi.org/10.36227/techrxiv.15081645

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Relativistic notions
The thrust of learning and hunger for knowledge

The definitions of gravity as a force changes with time. In the initial discovery, its noting more than the force of attraction between bodies having masses. Galileo though much before stated that, concerning the masses in retrospect with the gravitational attraction could in principle be the same if the body is either of a more mass or less mass, as air resistance would play a non-trivial part getting in way of the objects and attractions due to gravity. The experiment that, notionally performed from the Leaning tower of Pisa, Italy was justified by Neil Armstrong when he dropped a hammer and a feather simultaneously with both hitting ground at the same time paving the Galileo's notion more concrete and significant.

Later days, gravity proved to be the geometry of the space-time. By geometry, the norms that being carried over by that force could in principle be different with changing curvatures. Thus, differential geometry kicks-in, metric space topology paved the way, deifformisms preserved through killing vector fields, isometries, conformal invariance and mappings taken over through AdS_5 space-times satisfying the holographic principles got into the notions, all having an association to manifolds, curvatures that can be computable via Gaussian normal coordinates. The Riemann tensors proved to be significant in deducing the metric tensors, analyzing curvatures, contracting through Ricci tensors, finally ending up in Ricci scalars. The connection coefficients or Christoffel symbols that got attached with the geodesics, parallel transports with the angular deviations from the initial and final vectors gives the degrees of curvatures. Tensor fields satisfied a much pervasive properties through covariant and contravariant indices, that is, in essence combinations of various vectors.

Symplectic geometry through the relational significance between areas/volumes with angles paved the paved for a much further deductions that when associated with aspects of differential geometries through smooth manifolds, or cases of differentiable holomorphic domains, gives an enriching analogy of the frequencies, norms, symmetries, non-triviality, and the actions of gravity dependable on them via Riemann and conformal notions. Angles being preserved in conformal mappings, that when given into the AdS space-times, then the curvature and black holes outer-encompassing spatial properties in the 5-dimensions arrays the information preserving theorem and black holes information loss paradox. Holographic theorems also arises from this analogies.

As regards to the curvatures, several properties have been analyzed, from the values of Ω to the Kretchmann scalars K, cosmological properties are derived as regards to the fate of the universes via FLRW metrics, the curvatures associated with the universes: intrinsic and extrinsic, through either Negative/Hyperbolic, Positive/Elliptical, and the trivial Zero/Euclidean curvatures. Thus, any objects that got the properties of being curved, to say, the topological ball (*more viable than spheres, as spheres in algebraic topology means something that is hollow inside*) maintaining the most beautiful symmetries that is rotational and reflections, with the proof of natures tendency to acquire more spaces in expense of least energies, like, the round sphere, say, the topological ball always maintains a high volume in a least occupied surface areas, thus being most of the celestial objects taking the spherical shapes.

E.C.G Sudarshan's discovery of Tachyons was in a way permissible to attain speeds greater than light violating the postulates of special relativity, can make sense when the opposite geometry takes place through the motions associated with those Tachyons, as anything being hyperbolic would when moves over a convex hulled – elliptical/positively curved spaces then it rools over, slips down at the expense of the kinetic energies opposed to any celestial objects being positively curved warping spaces in hyperbolic geometry fields, which would comply with the mass – energy equivalence them of relative and gained kinetic energy while accelerating as opposed to those Tachyons which can in no way gain any energies, thus nothing can

stop its speed from crossing the stopped of the light – they are loosing momentums instead of gaining it.

This could also comply with the notions of spontaneous symmetry breaking where particles are falling from false vacuum to true vacuum in the potential wall $V(\phi)$ getting in touch with the scalar Higgs field gaining masses. The lowest stage of the harmonic oscillator if computed or hypothesized over the hyperbola of acting Higgs field, then this, when notions through the right – left, creation – annihilation properties of strings, the first stage productions are *graviton + dilation*. Thus, anything that lies beyond the potential wall could in no way come across the surround Higgs field and gains any masses. They, the negative or hyperbolic norms of their geometric is satisfied.

The happiest thought of Einstein, according to him, his thought experiment of particle in a box. This in modern days are satisfied with the relationship between gravity and accelerations. Thus, anything with a high RPM can have an inert force of gravity, keeping all other parameters constant. Revolving in an orbit won't generate any gravitational force, but the centrifugal force that when diffused through the rotations, then the angular motions which in any common sense associated by accelerations, could in principle be the generating forces of gravity ti the object, that's being rotated. This, significantly gives other momenta like torques, precessions, nutations.

Any inquisitive mind would then question that, as light bends in presence of massive objects, as appeared in gravitational lensing effects can induce accelerations in lights, as light is also going or passing through a curved trajectories (*here, not to be confuses with geodesics)*. To extrapolate this and to satisfy our minds that light can in no way attain any sorts of accelerations thus resulting in its change in velocity, altering the definitions of the universal spped limits, its necessary to do some basic tensorial calculations.

Taking the 4-dimensions of our space-times and realizing the fact that photons being an open strings with its end point attached to the Dirichlet (P) – branes, P being 3 (3S + 1T), we need not to worry about higher dimensions here as gravity although can leak to 10 spatial dimensions being a closed string without any boundary attachments to Dirichlet (P) – Branes, P $\geq$ 10, the coordinates in Euclidean analogy can be given by (providing the signature be either $(-,+,+,+)$ *or* $(+,-,-,-)$ depending upon the speed of the particles in the light cone – timelike, lightlike or spacelike),

$$(\Delta s)^2 = (\Delta ct)^2 - (\Delta x)^2 - (\Delta y)^2 - (\Delta z)^2$$

Or,

$$(\Delta s)^2 = -(\Delta ct)^2 + (\Delta x)^2 + (\Delta y)^2 + (\Delta z)^2$$

Can be written as a metric tensor over a manifold, giving an infinitesimal distances as *(provided the metric here is actually a scalar)*,

$$\mathcal{M}(x): g_{\mu\nu}\, dx^\mu dx^\nu$$

Or,

$$\mathcal{M}(x): g^{\mu\nu}\, dx_\mu dx_\nu$$

$$\exists\; g_{\mu\nu} = \frac{1}{g^{\mu\nu}} \text{ satisfying the reciprocal norms, } \forall\, \mathcal{M}(x)$$

This can be expressed in matrix notations as,

$$\begin{bmatrix} +1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{bmatrix}_{4\times4} \quad \text{or} \quad \begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & +1 & 0 & 0 \\ 0 & 0 & +1 & 0 \\ 0 & 0 & 0 & +1 \end{bmatrix}_{4\times4}$$

Thus if the 4 coordinates that has been taken here for computations can be seen then, *first is speed of light × time; second is x or length; third is y or breadth; fourth is z or height* – then, as the manifold considered here $\mathcal{M}$ taken over a parameterized space (x), as $\mathcal{M}(x)$ where the metric is playing, every dimension or coordinates x, y, z can be motioned by taking a vector which would suffices both the magnitude and dimensions, but in case of ct, speed of the light is not alone, rather its there dependent with time being multiplied to it; thus *light speed* in coordinate structure in non-existent alone but is dependent on time; implying that light is a pseudo - vector rather than a proper vector far from being expressed with all the definitions of a proper vector. But, the dependability of light with time being sepate can be seen through Lorentz transformations as,

$$t' = \frac{t}{\sqrt{1 - \left(\frac{v}{c}\right)^2}}$$

'c' can be taken as unitary here to ease out calculations and is the formulae of time – dilation.

Fitz – Gerald Lorentz contraction is associated to time – dilation as anything going close to the speed of light shrinks from the observers' perspectives or stationary reference frames. However, in recent times this analogy got modified to a rotation apart from shrinking as Terrell – Penrose rotations

Further assessment of the gravity in string theory supported by supersymmetry (Q – symmetry) as in 11-dimensional SUGRA (*supersymmetric strings*) can exist as a graviton being a Boson with a SUSY partner gravitino being a Fermion. The relation between Bose – Einstein statistics with Dirac – Fermi statistics can be satisfied to every particles and not only to the closed string gravitons, as in case of the U(1) gauge Bosons, photon being a Boson is accompanied by photino being a Fermions. The spin – quantum number difference between particles of Bosons with particles of fermions are integer and half – integer spins. All this extended symmetries or supersymmetries are developed to make corrections in the cosmological constant problem (in Λ at LHS of Einstein field equations or in the ΛCDM – cold dark matter models) where the +/− cancellations are the key tools in our understanding of the cosmological constant problems, also giving a hint that there are strings at trhe far end of the UV – limits.

String vibrations can take place through the 3-genus of the Calabi – Yau manifolds which are in essence the complex Kähler manifolds having vanishing Ricci curvatures. CY – manifolds or CY – 4 folds as appeared in F – Theory of Type II – B strings that are both T and S (Topological and Strong – Weak) duals to itself forms the Conifold singularities which are the compactified extra 6 – spatial dimensions accompanied with an anti – D Branes at one end with the other end extending to infinity satisfying the flows between Planck to TeV Branes solving soimewhat the hierarchy problem of the particle physics with gravity being smaller, arising from the $\sim 10^{20}$ orders of magnitude from the weak nuclear force (responsible for $\beta - decay$) as given by Randall – Sundrum (1) and Randall – Sundrum (2) models after Lisa Randall and Raman Sundrum.
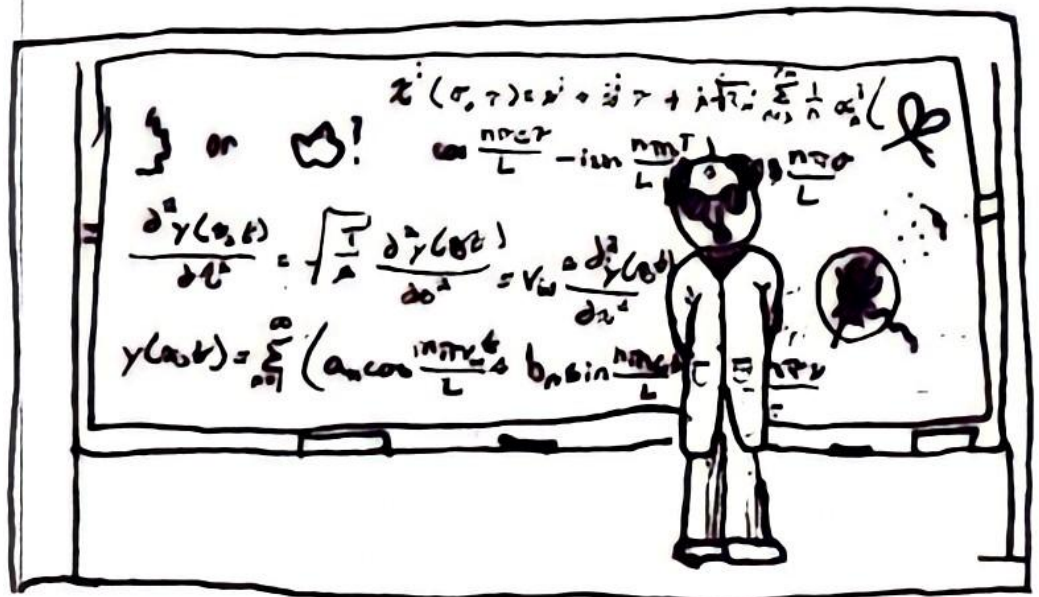
More modified analogy of gravity intertwined in spin – form networks through the granular space – times could be found in LQG (Loop Quantum Gravity).
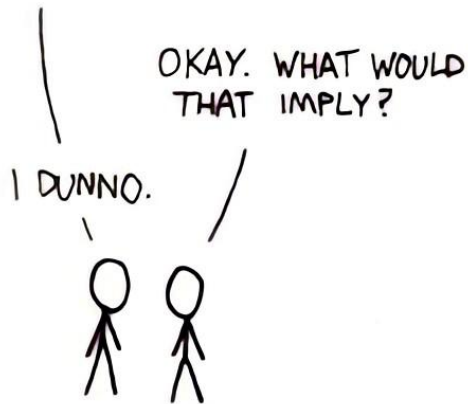
Both of the image depicts the notion of strings. Second image - The Tangent Side by Doug Terhune (Juzek89 *(Courtesy:* https://cr4.globalspec.com/blogentry/22383/The-Tangent-Side-String-Theory-Conclusion*)*

Decisions, conclusions and summaries
To know is to know as a conjecture not as a proof

Dependability produces the constant passion which gets tenacious only something is sprouting even if its at the stage of vague infancy. Normalizing those theories with the maximum happening probability aka, 1 will in no way take place if the ideas behind those studies are far - futuristic. The intuitive capacity along with cognitive intelligence of fellow humans is well woven into the workings of the nature – I'm not saying about those humans have a proper blue book of physical laws; rather they can in one way or other ascertain the fact that,

- Discoveries which are within the scope of humans to attain experimental reliability.
- Discoveries which are still not yet into the circumference of the technological goods thus, will remain as a conjecture to be proven later – perhaps centuries later or might get disproved.

Thus, emanating from this specific thought process, physicists and mathematicians have gone rogue in deploying all of their intelligent tools to predict or extend or foresee what's there at the other infinite end. This is the only door for the scientific progression through increment in scales of civilizations. To note: anything which has had been conjectured, in one way or the other, either through realistic experiments or through mathematics paved the way to be the successor of past ideas, that too orthodox enough to reject the modern fundamentality as regards to unifications.

Initiating from the electron – positron annihilations through the fine structure constant 1/137 to the regime of Planck's mass is quite a big deal of absurdity in ambitious human minds if not to be taken otherwise as such.

Sometimes, we need to check the UV regime to smash infinity while many a times, we're working on conjectures to look through the UV regime from the eagle eyes of physicists. doubting the conjectures, dismissing it as unrealistic without any norms of physical laws should really halter progressions. If we won't think today – then our descendent will not get the vague perspectives of what they are actually going to prove.

Classifying into 2 aspects as the weighted proportions from A to B, such that A is most important and easy to prove or satisfy, than B is,

(A)

If possible?

(B)

$\Lambda -$ cutoff / Renormalization
Things to worry,
- End is not perceivable.
- Abrupt stopping.
- What's there hidden beyond $\Lambda -$ cutoff?
- Are some valuable Information washing way by this schemes?

- Blindfolding the nature.
- (X+Y) conjugated domains
- AI takeover with machines to solve.
- Conjecture may shift to prove something else not been conjectured for.

Conjectures to be proven in future?
Things to satisfy us,
- Analogy is much futuristic.
- This will yield results in future.
- Extrapolations to extend the present conjecture to a far-sighted one with new norms.

Threshold capacity of knowledge and equality with God
We're certainly far below than God's and we would never reach his level

Unbounded norms of knowledge would create the limitless imagination emphasizing with profoundness the common grounds of reasoning alongside those norms which are so dense that even normal axioms of existing mathematics failed to answer them. Thus, the requirement arises as to make the solutions based on crude reasoning or on focus with the parallel analogy of common perspectives that are there already being implemented in academia.

The proportionality between acquirement of knowledge and proceedings of the array of time direct, thus giving every humans on this universe the intuition – Things that are not yet been discovered would be discovered in future. Thus, it might not be discovered the way it stated, although in most cases discovery is made based on the initial or firsthand works. In some cases researches to be modified to attain the required requisites for making a discovery. Profound analogy with reasoning would always leads the way, but if the things that are in the horizons have been procured by human brains, then needs developed to go beyond that and thus the abstractness initiates resulting the experiment to be cutoff completely replying on stiff mathematics and deductions to make a way.

However, their lies a fallacy and this should be noted that, how deep we might try to penetrate nature for arriving conclusions; nature would also get stringent forbidding us to acquire the knowledge that we want realizing that those are beyond our domains.

Making the reader blurred with philosophy is not the aim of this paper but it should be taken into mind that – nature being pervasive, we humans are doing everything to get the information hidden deep inside the minds to nature and tried to make conclusions from those physical laws.

Nature being the admirer of doing the requisites for maintain the universe stable - expenses least energy while doing the expensive tasks, maintaining symmetries, justifying norms and thus stabilizes this universe from micro, macro and coherent amalgamation of micro – macro domains. Humans with unbounded inquisitiveness if get to know every analytics, constructions, creation mechanisms, destruction and rebirthing – there in general no such differences existent between humans and natures.

Therefore, explanations got rigid and rigorous, mathematics loses its way trying to comprehend the most formidable aspects of physical laws: Scientists have been trying with their heart and soul to incorporate that specific key in their minds to do,
- Either developing a conjecture to be proven afterwards.
- Or, taking the alternative root to blindfold the nature and bypass the hindrances of the associated physical laws to commemorate ideas and thinks that once being developed from fictions got in the way of sciences accompanied by appropriately crafted logical reasoning.

Thus,

Humans have to careful in realizing the difference between conjecturing ideas and making it fall into experiments.

"Not all ideas conjectured could be proven."

"Not all ideas proven could be experimented."

Musings from the 5th dimensions
Selected writing with a carol

Nathan Rosen and Einstein put forward the first metric solutions of a wormhole. That time it's not been perceived through topological aspects. But the essence of exotic matter is a concern. Then Kip Throne and his student Morris developed the intense calculations of the Throne−Morris wormholes. Although, it's still the victim of exotic matters but still there are ways in which the tension (or, the matter density multiplied by the speed of light) would be so huge to collapse the wormhole throats. Thus, arises the Phenomenology of energy conditions!

Hawking developed the toughest formulations with Newman−Penrose Null Tetrads and quantum fluctuations in logarithmic norms to prescribe that travelling to past is forbidden making the history safe for historians.

Throne then gives his legendary ideas that Hawking was right and chronology is really protected but not in a strong way, rather it's weakly protected. This he penned the ANEC can be always positive (if you see the Stress−Energy−Momentum Tensor of Einstein field equations) then it's always greater than or equal to zero. But Throne argued that there can be patches of NEC violations on wormholes handles but still ANEC is positive or to the worst it's zero.

Thus the topological handle approach got so much dominance that Homer Ellis put forward the particle trajectories over asymptotic flows on geodesics through positive and negative infinities.

Situation improved. Raychowdhury equations for settled solutions arises and two professors approached the $f(r,t)$ modified norms of general relativity where the ANEC, NEC, DEC, SEC, WEC all are protected.

Topological handles being a torus over a surface can be expressed by Euler's polytope equations and thus there can be the proof of a naked singularity!

Cosmic censorship hypothesis of Roger Penrose is not at all violated!

Riemann and Differential Geometry provide the topological thrust of making a wormhole with a TESSERACT being the orthogonal extension of a cube (or a hypercube) matrix in norms vectored through spaces after spaces in the production of CTCs with null ray's moving away in time leaving the Cauchy Horizon in future!
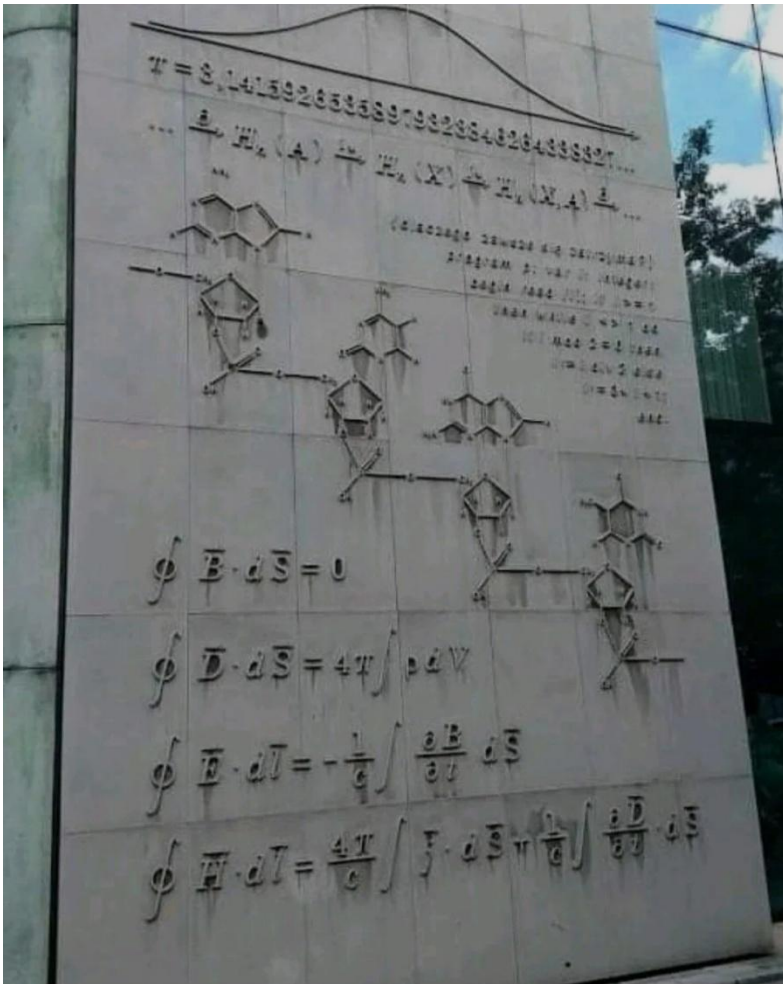
Maxwell equations are there in the forms of: Gauss Electricity law, Gauss magnetism law, Ampere law and Faraday's law in both integral and vector forms. And the most interesting thing is the "permeability of free space" that is $\mu^o.\varepsilon$ which has a value of $1/c^2$ from which Einstein borrowed the formulae and used it in relativity.

The first law states the divergence vector of a electric field is the flux density of the current flowing.

The second law states the divergence of the magnetic field which is always zero as magnet has both the positive and negative poles.

The third law states the current when induced through a coil produced a magnetic field and thereby uses a curl vector for that.

The fourth law unites electricity with magnetism and gives the constant value of the speed of the light along with a displacement current correction in curl vector forms.

Einstein, who would later remark that "Marie Curie is, of all celebrated beings, the only one whom fame has not corrupted," writes:

"Highly esteemed Mrs. Curie,

Do not laugh at me for writing you without having anything sensible to say. But I am so enraged by the base manner in which the public is presently daring to concern itself with you that I absolutely must give vent to this feeling. However, I am convinced that you consistently despise this rabble, whether it obsequiously lavishes respect on you or whether it attempts to satiate its lust for sensationalism! I am impelled to tell you how much I have come to admire your intellect, your drive, and your honesty, and that I consider myself lucky to have made your personal acquaintance in Brussels. Anyone who does not number among these reptiles is certainly happy, now as before, that we have such personages among us as you, and Langevin too, real people with whom one feels privileged to be in contact. If the rabble continues to occupy itself with you, then simply don't read that hogwash, but rather leave it to the reptile for whom it has been fabricated."

With most amicable regards to you, Langevin, and Perrin, yours very truly,

A. Einstein
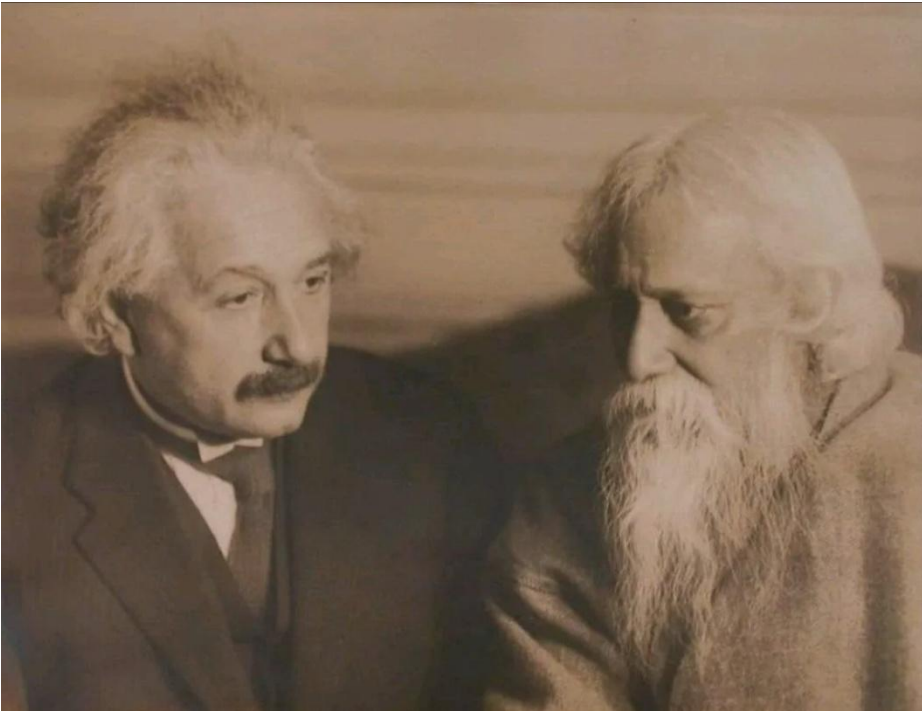
On July 14, 1930; when Einstein welcomed Nobel laureate in literature from India; Rabindranath Tagore (from Kolkata) in his house in outskirts of Berlin— The petals of India's rich culture, heritage, arts and philosophy sprouted in the horizon of modern physics. They discussed about history, science, philosophy and the traditionally held schism between science and religion which opened new arenas of vision in our understanding of nature and physical reality.

As per the Nobel committee: The Nobel Prize in Literature 1913 was awarded to Rabindranath Tagore "because of his profoundly sensitive, fresh and beautiful verse, by which, with consummate skill, he has made his poetic thought, expressed in his own English words, a part of the literature of the West."

At that time; Einstein was 51; Tagore was 70. When they met, Tagore did not know German and Einstein's English was too weak to converse. Hence, they had to use interpreters for conversation.

At the time of their meetings, Einstein's son-in-law Dimitri Marianoff said, "It was interesting to see them together — Tagore, the poet with the head of a thinker, and Einstein, the thinker with the head of a poet… Neither sought to press his opinion. But it seemed to an observer as though two planets were engaged in a chat."

The two legends proceeded to have one of the most stimulating, intellectually riveting conversations in history, exploring the age-old friction between science and religion that swept India in the early twentieth century, germinating a curious osmosis of Indian traditions and secular Western scientific doctrine.

"We owe a lot to the Indians, who taught us how to count, without which no worthwhile scientific discovery could have been made." — Albert Einstein quoted to Tagore during the conversation.

"A poet once said, 'The whole universe is in a glass of wine.' We will probably never know in what sense he meant it, for poets do not write to be understood. But it is true that if we look at a glass of wine closely enough we see the entire universe. There are the things of physics: the twisting liquid which evaporates depending on the wind and weather, the reflection in the glass; and our imagina‑ tion adds atoms. The glass is a distillation of the earth's rocks, and in its composition we see the secrets of the universe's age, and the evolution of stars. What strange array of chemicals are in the wine? How did they come to be? There are the ferments, the enzymes, the substrates, and the products. There in wine is found the great generalization; all life is fermentation. Nobody can dis‑ cover the chemistry of wine without discovering, as did Louis Pasteur, the cause of much disease. How vivid is the claret, pressing its existence into the consciousness that watches it! If our small minds, for some convenience, divide this glass of wine, this universe, into parts —— physics, biolo‑ gy, geology, astronomy, psychology, and so on —— remember that nature does not know it! So let us put it all back together, not forgetting ultimately what it is for. Let it give us one more final plea‑ sure; drink it and forget it all!"

— Theoretical physicist Richard P. Feynman

Continue...

Tardigrades, known colloquially as (water bears), are a phylum of eight-legged segmented micro-animals being the Toughest Extremophiles found on Earth?

They can survive in almost everywhere (even on Moon/Mars) in extreme conditions such as extreme salinity, high pressure, toxic chemical concentration, dry, or high/low temperature, in space also!

• Dehydration: They can survive for 30 years under laboratory conditions without a single drop of water. Some sources even claim that tardigrades resisted up to 120 years or have been found in ice 2000 years old that are still able to revive.

• Extreme high/low temperature: If you boil one tardigrade, it survives. If you put it to temperatures near the absolute zero ($-273\,^{\circ}C$), it survives. They can survive in ranges from $-270\,^{\circ}C$ to $150\,^{\circ}C$.

• Extreme pressure: Tardigrades can survive from vacuum to 6,000 atmospheres, which is equal to 6 times the pressure in the deepest point on Earth, the Mariana Trench (11,000 meters deep).

• Lethal radiation: Tardigrades can withstand the bombardment of radiation at a dose 1000 times lethal to a human.

• Toxic chemicals: If they are immersed in ether or pure alcohol, it survives.

• Impacts – Tardigrades can survive impacts up to about 900 meters per second, and momentary shock pressures up to about 1.14 gigapascals.

• Outer space: Tardigrades can survive into space without any protection. To survive in space, tardigrades have to deal with several harsh conditions in combination: vacuum, cosmic rays, and ultraviolet radiation 1,000 times higher than that of the Earth's surface.

• Anoxybiosis: In situations lacking oxygen (anoxia), the oxygen concentration isn't high enough to sustain normal activity. Tardigrades will suspend their metabolism and become swollen by taking water. They stay immobile but can survive for prolonged periods of time.

• Cryobiosis: Under a low temperature (below $0\,^{\circ}C$), other cells and organisms will die due to the freezing of intracellular water. When the water of living beings crystallizes, the ice will tear and rupture cells, causing the cells to die. To combat this, tardigrades can enter Cryobiosis and utilizes a type of protein and survive themselves.
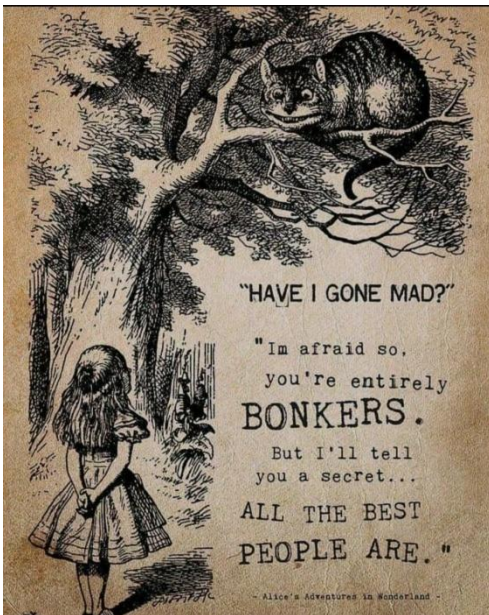
Lewis Carroll is a prominent figure in the world for his immortal creation "Alice's Adventures in Wonderland" for every ages of readers. Although it's the (Pen name), the original name of Lewis Carroll is Charles Lutwidge Dodgson.

The most interesting and little known fact about him is that he was a mathematician. In 1852, he obtained first-class honours in Mathematics Moderations and thereafter nominated to a Studentship for further studies. His talent as a mathematician won him the Christ Church Mathematical Lectureship in 1855, which he continued to hold for 26 years with several published papers.

Examples of references to mathematics in Alice include:

• Chapter 1 ("Down the Rabbit-Hole"): in the midst of shrinking, Alice waxes philosophic concerning what final size she will end up as, perhaps "going out altogether, like a candle"; this pondering reflects the concept of a limit.

• Chapter 2 ("The Pool of Tears"): Alice tries to perform multiplication but produces some odd results: "Let me see: four times five is twelve, and four times six is thirteen, and four times seven is—oh dear! I shall never get to twenty at that rate!" This explores the representation of numbers using different bases and positional numeral systems: $4 \times 5 = 12$ in base 18 notation, $4 \times 6 = 13$ in base 21 notation, and $4 \times 7 = 14$ in base 24 notation. Continuing this sequence, going up three bases each time, the result will continue to be less than 20 in the corresponding base notation. (After $4 \times 12 = 19$ in Base 39, the product would be $4 \times 13 = 1A$ in Base 42, then 1B, 1C, 1D, and so on.)

• Chapter 7 ("A Mad Tea-Party"): The March Hare, the Hatter, and the Dormouse give several examples in which the semantic value of a sentence A is not the same value of the converse of A (for example, "Why, you might just as well say that 'I see what I eat' is the same thing as 'I eat what I see'!"); in logic and mathematics, this is discussing a converse relation. Alice also ponders what it means when the changing of seats around the circular table places them back at the beginning. This is an observation of addition on the ring of integers modulo N.

The Cheshire cat (shown in the image)

"My own conclusion is that today there is no interpretation of quantum mechanics that does not have serious flaws. This view is not universally shared. Indeed, many physicists are satisfied with their own interpretation of quantum mechanics. But different physicists are satisfied with different interpretations. In my view, we ought to take seriously the possibility of finding some more satis-factory other theory, to which quantum mechanics is only a good approximation."

—Steven Weinberg,

Lectures on Quantum Mechanics (2nd ed., 2015), Ch. 3 : General Principles of Quantum Mechanics.

Continue...

"If God created the universe; then who created God?" —Rig Veda

This statement is based on 2 assumptions: (either/or)

1. You can't frame a character if it's not existent.

2. The idea of Physics & Philosophy as a study of nature is "pretentious & illusory".

Continue...

A glance at the life of physicist Stephen Hawking, who left us at the age of 76.

Jan 08, 1942— Born in Oxford, England, his parents are Frank Hawking, a biologist, and Isobel Hawking, a medical research secretary.

1952— Attends St. Albans. Albans School.

1959— Receives scholarship to attend University College, Oxford, from which he graduates with a degree in natural science.

1962— Begins graduate research in cosmology at Cambridge University.

1963— Diagnosed with degenerative nerve disorder ALS, or Lou Gehrig's disease, at the age of 21. He was given two years to live.

July 14, 1965— Marries his first wife Jane Wilde, a modern language student he met at Cambridge.

1967— The couple's first son, Robert is born.

1970, Jane gives birth to a daughter Lucy.

1974— Elected as fellow of the royal society at age 32 one of the youngest people to receive the order.

1979— becomes Luciasian professor of mathematics at Cambridge, a prestigious position once held by Isaac Newton.

1979: Aged 35, Hawking became Lucasian Professor of Mathematics at Cambridge – a post held by some of Britain's most important physicists including Isaac Newton.

1985: While in Geneva, Hawking was admitted to hospital with a life—threatening bout of pneumonia. He lost his voice but adopted his famous speech synthesizer.

1988: A Brief History of Time was released and became one of the best—selling books of all time – nine million copies were sold.

1995: After 25 years of marriage and three children, Stephen and Jane Hawking separated and divorced. Stephen married his nurse, Elaine Mason.

1999: Hawking appeared on popular cartoon show The Simpsons and Star Trek.

2010: In his best—selling book The Grand Design, Hawking made more bold claims about the hunt for a theory of everything. Hawking backed a radical new idea, M—theory, which theorises there is more than one universe.

2014: In the film The Theory of Everything, Eddie Redmayne gave an Oscar—winning portrayal of Hawking.

When Cat Boxed Schr$\frac{\partial^2 o}{\partial t^2}$dinger

It's really safe to revert the experiment and name it as Cat's Schrodinger instead of Schrodinger's Cat ? Yes! Because this will not affect the outcome.

In one way, the Schrodinger closed his Cat in a BOX & in the other way the Cat closed Schrodinger in the box. Both are same in quantum mechanics if the BOX is not opened. Perhaps some of you might have thought that why not put a camera inside the BOX and let it record the Cats Position: ALIVE or DEAD. But in order to see the picture you have to open the BOX and take out the camera but the BOX can't be opened. The Cat is in a superposition of being LIVING and DEAD at a same time. Either the Cat is Deadly LIVING or the Cat is Livingly DEAD.

Anyways;

Either the Schrodinger is Deadly ALIVE or the Schrodinger is Lively DEAD. The Cat has a perfect Eigen function, the two properties of which can't neither be determined or the two properties stay side by side. Anyway or reverse way it works the same. If the Cat is stimulated with the COPEN−HAGEN INTERPRETATION, then there exist two worlds for the Cat − one in which the Cat is LIVING & the other in which the Cat is DEAD.

Say, in one world Hitler Wins WORLD WAR II or in another world HITLER loses WORLD WAR II. But the Cat or the Schrodinger: Whoever locked whomever is the Macroscopic version of the Mi−croscopic quantum reality. It bridges between the wavelength of an electron to that of a wavelength of a Cat or Schrodinger. The wave function works perfectly smoothly until you observe it but when you open the BOX to see what is the condition of the Cat inside it, the wave function of the Cat got immediately collapsed into two possible states, One, in which it is LIVING, Other, in which it is DEAD. But what is the actual realm? Is it actually LIVING or actually DEAD? Well, according to COPENHAGEN INTERPRETATION this can't be said. Neither can be said if the Cat packed Schrodinger inside the box. Everything is a Possibility. You can't differentiate between two worlds at a particular instant of Time, either you got it wrong or you got it collapsed. Some uncanny always happens at the quantum Realm. That's the PROBABILITY FUNCTION or The Heisenberg's Un−certainty Principle.

This is observed in Kaon decay and shows that how asymmetric the matter and antimatter are. The Kaon is made of 3 Strange Quarks with a net charge of (−1/3−1/3−1/3) which is 1/2 times heavier than a Proton. The down quark is also there along with strange. In the Anti−Kaon there is anti−strange quark which is slightly heavier and therefore decays into the down quark with a strange quark as the partner. The strange quark may further decay to anti down quark. The swapping of charges occurs. K0 is neutral kaon and K+|K− is +Ve/−Ve Kaon. Transformation from K0 to K+ takes a little more time than reverse. The intrinsic spin is present. And while the swapping of charges the Kaon emits 1003 Positrons along with 997 electrons. Anti−Kaon has mirror symmetry along with Charge swapping & Time backward notion. The Feynman diagram shows the K0 goes backward in time. The Poles inside the Kaon are opposite as Anti−Kaon. But the anti−Kaon and Kaon both have a Positive energy. There is no negative energy in the antimatter. This is due to the fact that when an electron emerges from the vacuum as a virtual particle then a hole is made which corresponds to a positive energy and along with created a Positive−Electron or Positron which is the Positive Anti−Matter of electron. Parity is mirror. Charge is swapped and Time runs backwards in the CP Symmetry.

Continue...

How did Queen DIDO accidentally discovered Topology in 200 BC ?

Topology is a pervasive tool encompassing algebraic topology, geometric topology along with metric space topology that includes differential Geometry, tensor calculus, Symplectic Geometry and Rieman curvature theorem which are essential tools for learning physics and applied mathematics.

But how it got discovered?

In Geometric Topology the oldest problem can be traced back to 200 BC.

The problem is known as ISOPERIMETRIC INEQUALITY.

The Problem is based on the assumptions that…. Given a simple closed curve, A circle will always have a larger area inside it than any other shapes. This is a 2 Dimensional problem, however this can be generalized in N Dimensions in Topology.

The Solution is based on $2ab \leq a^2 + b^2$ {Where $a^2 + b^2$ represents a circle of length L and the length which goes from 0 to L having a Perimeter P always greater than any curves that is $2ab$}

The history of the origin goes like this:

Once upon a Time there lived a Queen named Dido. She migrated to Africa and asks the local landlord to give her land for setting up a new palace. The local landlord gave her a Bull and said... "Kill the Bull and enclose the space with its skin. The amount of space you can enclose with its skin is your land"….

So, Dido did a clever thing: She cuts the skin of the Bull to pieces and enclosed a region of circle. She didn't enclose any other shapes thinking that the circle will enclose more areas within it. And this turned out to be true. So, she assumed the answer of the ISOPERIMETRIC PROBLEM.

However, the real mathematical solution came in 1840 AD.

ISOPERIMETRIC INEQUALITY = ISOMETRY+ PERIMETER INEQUALITY

Here Isometry means invariance in rotation, translation and reflection symmetry.

Satyendra Nath Bose
Bosons, Dirac and Einstein

On 1st January 1894, a mathematician and physicist was born in Calcutta, Bengal Presidency, British India, who's work with Albert Einstein changed the course of physics and introduced the world a new form of matter: The Bose–Einstein Condensate.

He was a polymath having a wide range of interests in varied fields, including physics, mathematics, chemistry, biology, mineralogy, philosophy, arts, literature, and music. He served on many research and development committees in sovereign India.

The class of particles that obey Bose‑Einstein statistics, bosons, was named after Bose by Paul Dirac.

Bose received a Bachelor of Science in mixed mathematics from Presidency College, standing first in 1913. Then he joined Sir Ashutosh Mukherjee's newly formed Science College where he again stood first in the MSc mixed mathematics exam in 1915. His marks in the MSc examination created a new record in the annals of the University of Calcutta, which is yet to be surpassed. After completing his MSc, Bose joined the Science college, Calcutta University as a research scholar in 1916 and started his studies in the theory of relativity. That time Quantum theory had just appeared on the horizon and important results had started pouring in.

SatyendraNath Bose, along with Saha, presented several papers in theoretical physics and pure mathematics from 1918 onwards. In 1924, while working as a Reader at the Physics Department of the University of Dhaka, Bose wrote a paper deriving Planck's quantum radiation law without any reference to classical physics by using a novel way of counting states with identical particles. This paper was seminal in creating the important field of quantum statistics. Though not accepted at once for publication, he sent the article directly to Albert Einstein in Germany. Einstein, recognising the importance of the paper, translated it into German himself and submitted it on Bose's behalf to the prestigious ZeitschriftfürPhysik. As a result of this recognition, Bose was able to work for two years in European X–ray and Crystallography laboratories, during which he worked with Louis de Broglie, Marie Curie, and Einstein.

S.N. Bose was nominated by K. Banerji (1956), D.S. Kothari (1959), S.N. Bagchi (1962), and A.K. Dutta (1962) for the Nobel Prize in Physics, for his contribution to Bose–Einstein statistics and the unified field theory.

Although 7 Nobel Prizes were awarded for research related to S N Bose's concepts of the boson, Bose‑Einstein statistics and Bose‑Einstein condensate, Bose himself was not awarded Nobel Prize.

He Is best known for:

- Bose‑Einstein condensate

- Bose‑Einstein statistics

- Bose‑Einstein distribution

- Bose‑Einstein correlations

- Bose gas

- Boson

- Ideal Bose Equation of State

- Photon gas

"Half of the particles in this universe obeys his statistics" - The Boson (termed for all force carrying particles).

Photograph Of Prof. Satyendra Nath Bose Head Of the Department Of Physics Dacca University 1943

Satyendra Nath Bose. *Picture shared to me by Professor. Mahmud Khan from his collections.*

Dirac and Satyendra Nath Bose met in Calcutta Coffee House.

Now, the obvious question that'll come to anyone's mind is that "Why Bose with Dirac as Bose has worked with Einstein?".

The conflict of General Relativity and Quantum Theory is well known in Theoretical Physics and Einstein also remarked that "God doesn't play dice!". Moreover, Einstein argued with Bohr on several letters about the Quantum Theory.

Physics now a days reached to that stage where the "Scale Invariance" is taking place between GR and QM although through a very rough way.

See the following Lie Group of Particle Physics: $U(1) \otimes SU(2) \otimes SU(3)$

Closely looking, this contains only 3 out of 4 fundamental forces of Nature: Electromagnetic, Strong, Weak Nuclear Force.

But not Gravity?

2 Kinds of particles are: Bosons obeying Bose-Einstein Stats which are force carrying particles, and Fermions obeying Dirac-Fermi Stats which are matter Particles.

Bosons are of integer spins like $(1, 2 \cdots ..)$.

Fermions are of half integer spins like $(1/2, 3/2 \cdots \cdots)$.

Photons are there in the Standard Model but Gravitons are not there: mainly because Gravity is approx. $10^{2 0}$ orders of magnitude weaker than the weakest force of nature i.e., weak nuclear force.

Hence, thanks to Witten, Susskind, Kaku, Polchinsky and many other string theorists who have been trying to incorporate the two forces within a single framework. Thus, the idea of SUPERSYMMETRIC PARTICLES have been mathematically established.

The theory of LARGE EXTRA DIMENSIONS, SMALL EXTRA DIMENSIONS, ADD MODELS, RANDALL-SUNDRUM MODELS between Planck-TeV Scales are there to solve the scale invariance or Hierarchy Problem in Particle Physics.

More relevant is the TYPE II-B STRINGS of M-Theory which are both Topological/Strong-Weak DUALITY Interrelated. They contains both Open strings like Photons as well as Closed strings like Gravitons.

Photon – Photino (Supersymmetric Particles) : Graviton – Gravitino (Supersymmetric Particles)

Thus, this leads to the development of SL(2,Z) Gauge groups of F-Theory by Vafa.

Thus, when Satyendra Nath Bose worked on Bosons that includes gravity we all have to remember that Bosons also have Photons.

Photons are OPEN STRINGS restricted by Dirichlet and Newman boundary conditions thus can't propagate to other 10 dimensions and are constrained over the 4-D Branes where on its surface the Standard Model plays its role.

Gravity on the other hand is so pervasive being a CLOSED STRINGS that without any restrictions to Branes boundaries they are constantly leaking to higher dimensions.

That leaking is the cause of this tremendous weakness of Gravity.

But all we want is to develop a TOE (Theory of Everything) where both Photons, Gravitons, Strong, Weak nuclear forces are there in an attempt of make GR scaled down to QM and QM scales with GR.

Thus only, we'll get the Einstein's dream of an unified field theory. So, it ins't surprising to see SatyendraNath Bose with Einstein as well as Dirac.
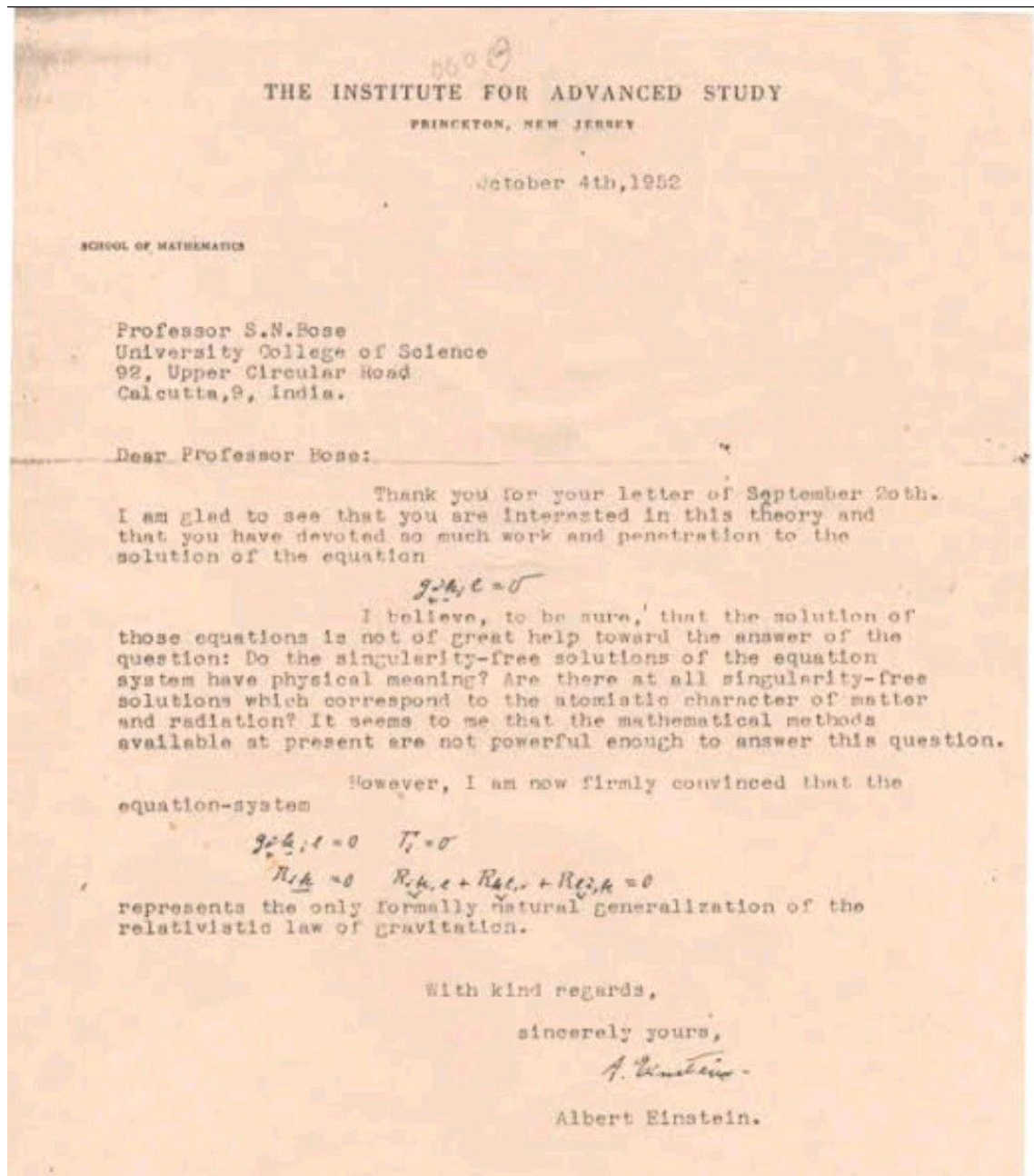
Letter dated Oct 4 1952 from Albert Einstein to SatyendraNath Bose.
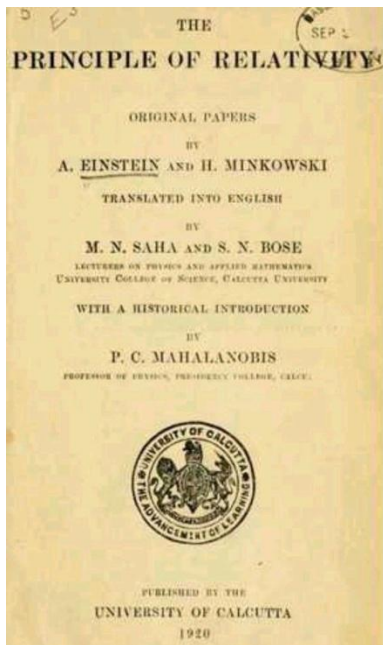
THE
PRINCIPLE OF RELATIVITY

ORIGINAL PAPERS
BY
A. EINSTEIN AND H. MINKOWSKI

TRANSLATED INTO ENGLISH
BY
M. N. SAHA AND S. N. BOSE
LECTURERS ON PHYSICS AND APPLIED MATHEMATICS
University College of Science, Calcutta University

WITH A HISTORICAL INTRODUCTION
BY
P. C. MAHALANOBIS
PROFESSOR OF PHYSICS, PRESIDENCY COLLEGE, CALC.

PUBLISHED BY THE
UNIVERSITY OF CALCUTTA
1920

The Principle of Relativity. Original Papers by A. Einstein and H. Minkowski, translated into English by M.N. Saha and S.N. Bose with a historical introduction by P.C. Mahalanobis – This is the first English translation from the original German — anywhere in the world. By two young Lecturers of Physics and Applied Mathematics — MeghnadSaha (26 years old) and Satyendra Nath Bose (25 years old).

Saha knew passable German, Bose had to learn German to do the work. The 176-page publication includes the following Table of Contents which is probably the modern covered edition of the book as mentioned in: https://bit.ly/3I7mEjF

• Historical Introduction (By Mr. P.C. Mahalanobis)

• On the Electrodynamics of Moving Bodies [Einstein's first paper on the restricted (Special) Theory of Relativity, originally published in the Annalen der Physik in 1905. Translated from the original German by Dr. MeghnadSaha]

• Albrecht Einstein [A short biographical note by Dr. MeghnadSaha]

• Principle of Relativity [H. Minkowski's original paper on the restricted Principle of Relativity first published in 1909. Translated from the original German by Dr. MeghnadSaha]

• Appendix to the above by H. Minkowski

[Translated by Dr. MeghnadSaha]

• The Foundation of the Generalized Theory of Relativity [A. Einstein's second paper on the Generalised Principle first published in 1916. Translated from the original German by Mr. Satyendra-Nath Bose]

• Notes
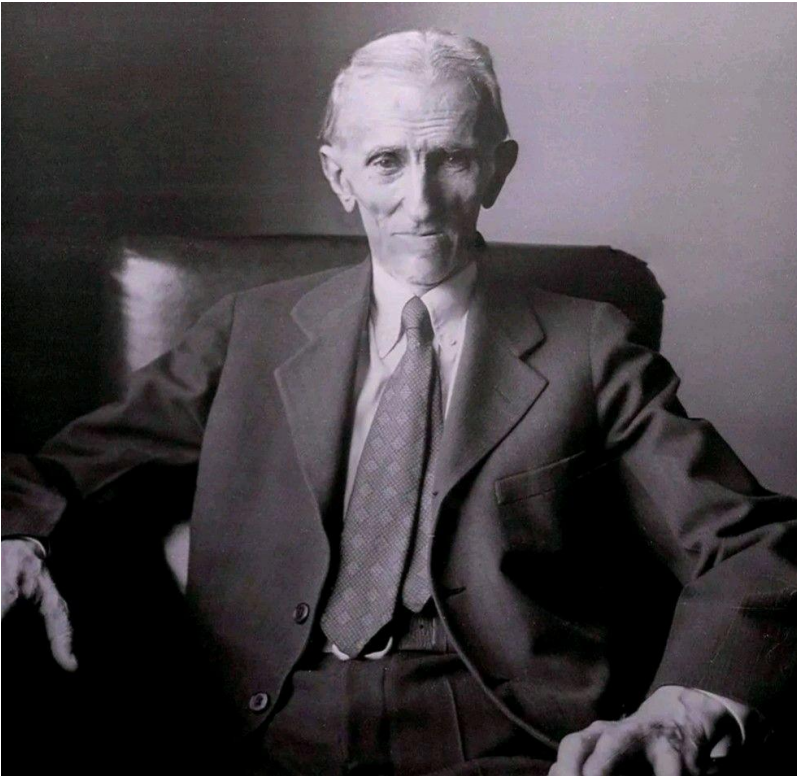
We humans shall always remain indebted for your tireless efforts to improve the "elevation" of humankind. As it's said that "Tesla was more than a man of humanity rather than an inventor" … It's also said that "If Tesla's technological discoveries shouldn't be censored then; we humans would have probably traveled to the stars right now!" When Tesla was asked that "Why he didn't file cases inspite of his patents being compromised!" … Tesla replied "Both me and they are humans! However, I feel shame for those who stole my patents without having the ability to develop those ideas in themselves!" … Tesla was born in a Stormy midnight in Serbia (modern, Croatia) – due to bad weather and heavy lightning in that midnight in the village; everybody told that this might be something not good … But his mother after giving birth to him said that Tesla being born on this thunderstorm night; will be one of the wizards of electricity!… Yes! And that happened – "Tesla surely been a real wizard of electricity"; Unfortunately most of his discoveries are censored but "apart from [some] modern orthodox scientific communities…. His work has started gaining attention now!" and this will eventually make a giant leap in human kind!

Nikola Tesla's last message to his mother: "All these years that I had spent in the service of mankind brought me nothing but insults and humiliation."

When Feynman met Dirac!

Dirac and Feynman. One, a man of few words and the other quite the opposite. Both geniuses. They were two different physicists in terms of approach. For Dirac, physics was a search of pretty mathematics. Feynman, however, always began his work from observations he made in the real world.

Their first meeting In 1946 was very brief and unproductive. Dirac asked: "Do you have an equation?" Feynman being a beginner at the time didn't and so Dirac walked away after a silence.

Their third and last meeting occurred in 1962 out of which came an iconic picture of the duo. It was taken by Polish photographer Marek Holzman during the relativity conference in Warsaw. The following conversation is said to have transpired.

Feynman: Hello again. I'm Feynman.

Dirac: I'm Dirac.

Feynman (admiringly): It must be wonderful to be the discoverer of that equation (he meant Dirac equation).

Dirac: That was a long time ago. [1928]

Dirac: What are you working on now?

Feynman: Mesons.

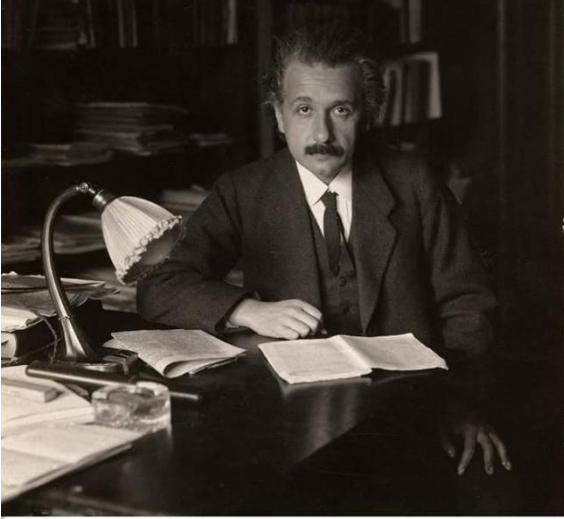Dirac: Are you trying to find an equation for them?

Feynman: No; it's very hard!

Dirac: One must try.

Dirac had always been a man of few words and humble [as quoted by him "If you are receptive and humble, mathematics will lead you by the hand…"] while Feynmann being a curious character full of intelligence stacked with humour.

"A Clever Person Solves a Problem. A Wise Person Avoids It" – Einstein (?)

Based on a wider audiences account along with various online sources: it's been mentioned that the quote was actually by Einstein himself.

However, confusion arises as to the original source of this wise quote: Various sources are found "somewhat likely the same; although in some cases a little altered with almost the same meaning" and this can be attributed to not one, but several (though in a state of confusion!) – Albert Einstein (or) Jerome Halprin (or) Abba Eban (or) Leonard Lyons (or) Sidney Greenberg (or) Paul Connett (or) Anonymous (!)

Investigations have been made in details on https://lnkd.in/gJdy8xd3 where the author argues that 'although he himself heard this quote stated back to Einstein but he even after a tedious search couldn't find a proper cite of this quote!'

It's natural that, some eminent scholars, personalities emerged as "legends" to the human societies as an immortal legacies – however: as humans have no bound in their imaginations, thus they curate "fancy" things about those "legends" and buzzed to the society that mutates generations after generations with further spice getting added to the original source through proceedings of time!

I'm not saying that the author claimed himself as "quoteinvestigator" is cent persent accurate; maybe he is – maybe not! But there're instances of something being decorated to a relatable legend and humans have tricked their mind to believe it to be true!

According to the "*quoteinvestigator*" – There is no substantive evidence that Einstein wrote or spoke either of the statements above. Neither is listed in the comprehensive reference "The Ultimate Quotable Einstein" from Princeton University Press. Einstein died in 1955, and he received credit for the saying many years afterward in 1992. Listed Reference for his statement as mentioned by him is "2010, The Ultimate Quotable Einstein, Edited by Alice Calaprice, Section: (Statement does not appear), Princeton University Press, Princeton, New Jersey. (Verified on paper)".

Are we standing on the shoulders of giants?

The furthest limits of reason has the perspectives to answer the unsolved mysteries but it's "more than difficult" to probe the deepest part of nature as then we will run out of logic to explain the phenomena!

But humans tried to explore the nature. Where the mathematical tools of physics failed to arrive any conclusions, the philosophy holds the hand. Philosophy always tried to explain the farthest fathom of mysteries to develop a knowledge of interest. But does philosophy succeed? Humans have no answer. Just when people tries to explain the absurdness of the hidden beauty of nature from a viewpoint of infinity then the complex physics have taken the aspects in such a difficult manner that the mathematics itself cried out for a new mathematics to be invented!

Our knowledge is not sufficient and neither will be. Knowledge always strives to gain more and humans always want to race behind the fast-forwarding knowledge of reason to provide a complicated solution to it in an easy way.

Just as the limits of big is endless, so as the limits of small. It will never ever be possible to probe into the greater of the greater or the smaller of the smaller to provide a physical understanding to human mind.

The limits of reason are limitless and limitless is the consequence of infinity.

When will it be possible for humans to probe deeper into infinity and to attempt a solution of infinite model in a finite way? If infinity can be seen as finite, then probably the edge of knowledge can be reached by humans. Beyond this end, either there will be no more knowledge to acquire or there will still remain something as unachievable as though the edge is just a horizon with a further area left to explore afterwards.

The limits of thought and the limits of reasoning are quite different from the perspective of the limits of nature. Natural law can never be explored fully as something unattainable always remains to be attended afterwards at the outer limits of reasoning.

The greatest mystery of nature lies in its origin and the greatest limits of the origin lies in the infinity. It is beyond the capacity of modern philosophy to question the finiteness of infinity beyond the ordinary boundary of knowledge. The unattainable knowledge even though can be attained remains unattainable. Nature is aware of its prediction and so as infinity as a part of it. The knowledge of knowing seems meaningless when the concept of fundamentality of knowledge tends to take over the infinity.

Nothing in nature is finite. Not even the conclusion. Everything is infinite in its own way as if something more needs to be deciphered to attain the edge of the knowledge.

Beyond infinity is oblivion and oblivion is an uncertain boundless barrier of knowledge. Finite things will always tend to become infinite and the outermost reason of knowledge remains a question to all of us!

The nature of Gravity – Scalar, Vector or Tensor?

Gravity is scalar but Gravitational force is a vector: So, Gravitational acceleration should be a gradient of the scalar field or curl of the scalar field (if it warps space–time) (Big confusion!). Gravity can be a Tensor field where Relativity makes little corrections to it making only the scalar component prominent (But many considered Newton's Gravity to be a scalar!)

Gravity and displacement are vectors. They have a value and a direction. The reason we get a scalar energy from vectors gravity and displacement is because, in this case, they tend to point in same direction.

Before Einstein, gravitation was given in the same way, as consequence of a gravitational force (vectorial), given through a scalar potential field, dependent of the mass of the particles. Thus, Newton's gravity is scalar. The acceleration obtained due to gravitational force is called its acceleration due to gravity. Its SI unit is m/s² and is a vector, which means it has both a magnitude and a direction. Speed is a scalar quantity – it is the rate of change in the distance travelled by an object, while velocity is a vector quantity – it is the speed of an object in a particular direction. Thus, Newtonian gravity is called a scalar theory. The gravitational force is dependent of the distance 'r' of the massive objects to each other (more exactly, their centre of mass).

But gravitational force, as any force, is a vector/also a tensor! However, in most common use, relativity contributes only a tiny correction and it can be safely ignored. So, most of the components of this tensor field are so small that they contribute very little to the motion of a test particle. The only term that remains relevant, then, is one component of that tensor field, which will behave (approximately) as a scalar field.

The gradient of that scalar field is, in fact, the gravitational acceleration. Multiplied by the mass of a test particle, it yields the (vector) force on that particle.

From Poisson Equation the gradient of gravity is: $\nabla \varphi = -4\pi G \rho$. Now, the divergence of the gradient: $\nabla \cdot \nabla \varphi = \nabla^2 = 0$ (So, the Laplacian is 0). Again from D'Alemberts operator (Box operator) we see the same thing: $\Box \varphi = 0$. From Relativity: The time component of the metric is $\varphi \sim 1/2$ g_{oo}. So, $\nabla \varphi = -8\pi G \rho$ where the (ρ) can be substituted for stress–energy–momentum tensor T_{uv}. Hence, the RHS of Eintein field equation is $-8\pi G/c^4 \cdot T_{uv}$. But if we consider the tidal force then isn't it a vector with a vector field where the divergence is negative? A vector bundle pointing towards the centre of a sphere means that $\nabla \varphi = -0$ outside of the sphere which is the earth. If gravity warps spacetime then why not we consider a curl instead of divergence that is $\nabla \times \varphi \sim 4\pi G \rho$.
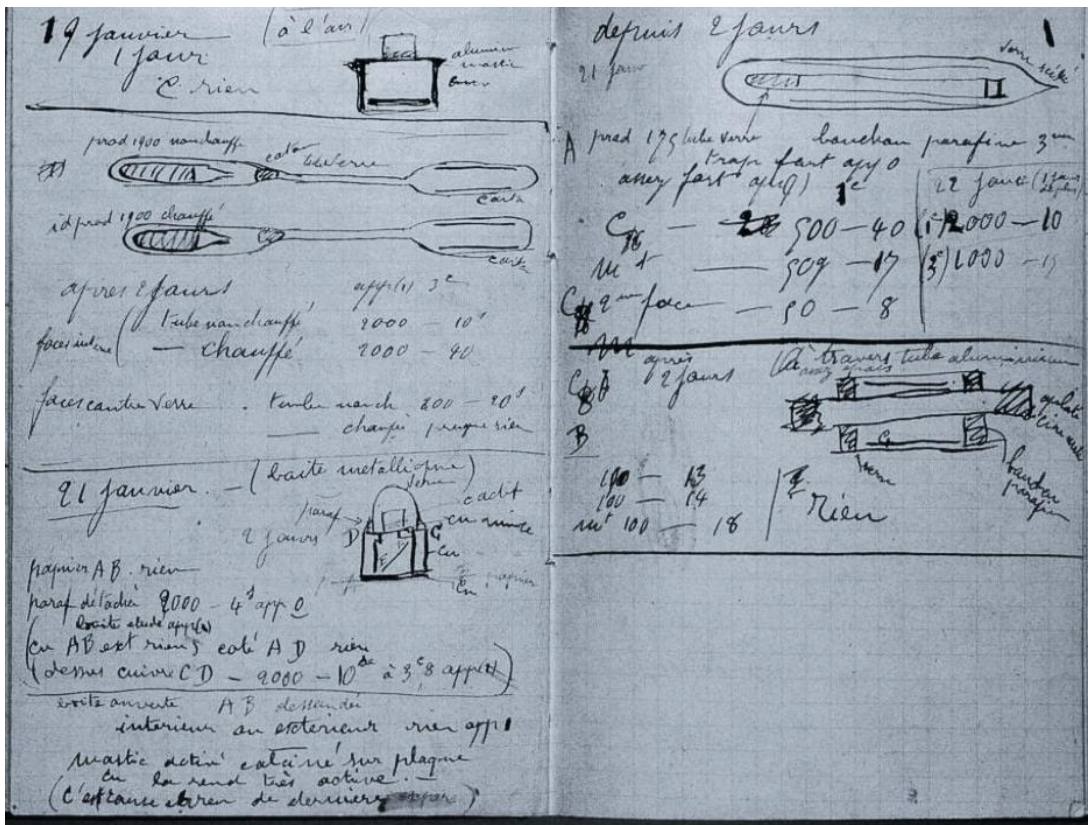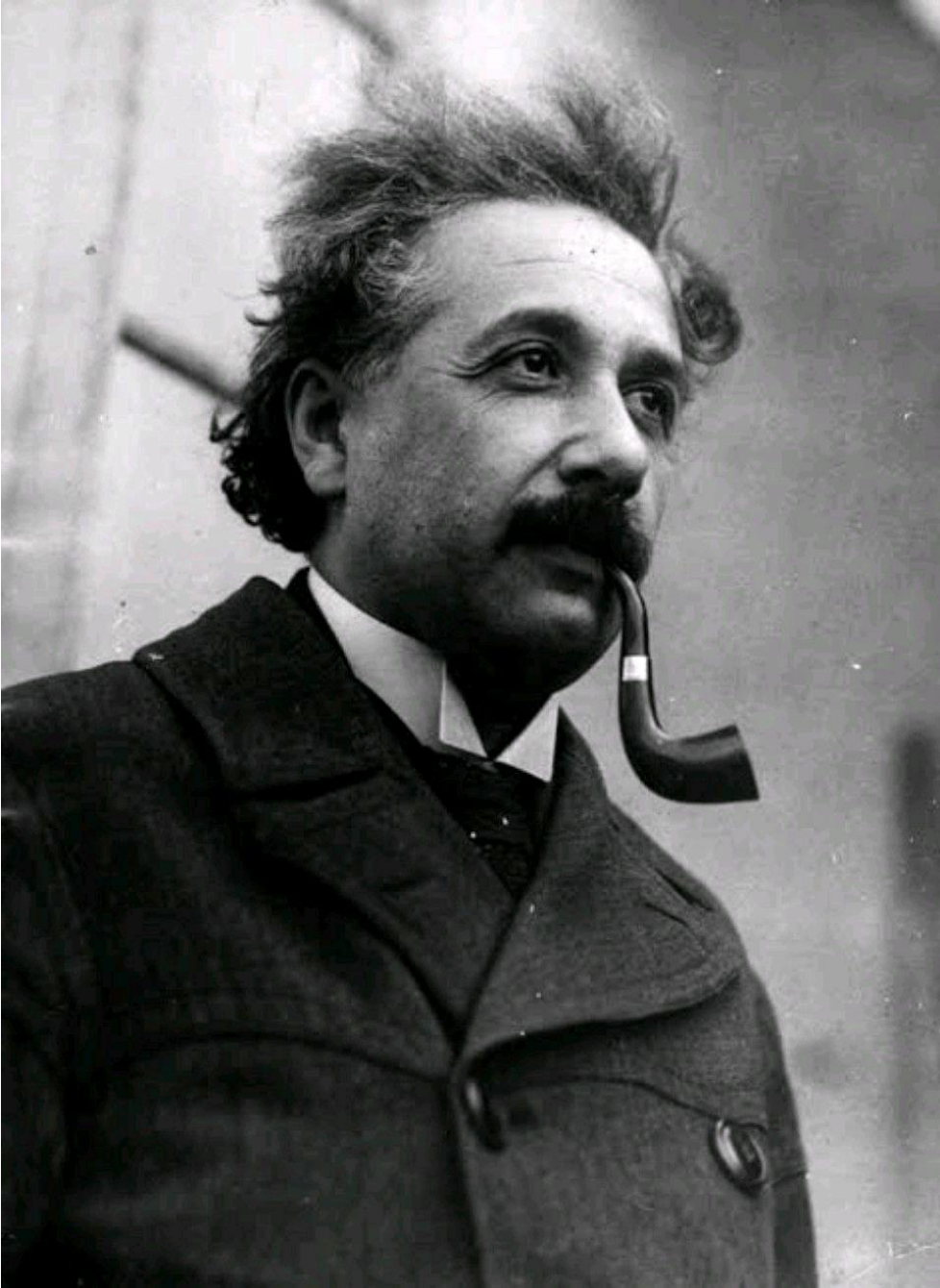
Marie Curie's belongings such as papers, are so radioactive that they are contained into lead boxes in Paris, and will continue to be radioactive for 1500 years.

Marie Curie, known as the 'mother of modern physics', died from aplastic anaemia, a rare condition linked to high levels of exposure to her famed dis−coveries, the radioactive elements polonium and radium.

There was a young lady named Bright,
Whose speed was far faster than light,
She set out one day in a relative way,
And returned on the previous night!

"Two things are infinite: the universe and human stupidity; and I'm not sure about the universe." — Albert Einstein

"Mathematics is not about calculating things. It's about understanding the operations of nature at their deepest level. Mathematics is just another myth in this mythical world!" — Gödel

Mathematics was neither invented nor discovered. It's been there since the creation of almost everything, however, we humans are just accidentally lucky enough to explore it! — I said thinking perhaps Perelman said it.

Hilbert showed us that the mathematical conjectures are so badly segregated throughout the history... it's necessary to arrange them in order before one proceeds to tackle them. ‑ I said.

Paul Erdős was probably the only one who tried to show us that it's senseless to classify a mathematical problem as hard or easy… Either it should be computable or not! ‑ I said.

Declarations
Conflict of interest, acknowledgements, ORCID and notes

I, myself being the sole author of this paper declare that there are no conflicts of interests involved in this.

My ORCID: 0000-0003-0466-750X

This paper being an interpretive analogy covering the aspects of a theoretical physicists evaluation of ideas, no such references are as such taken for the purpose of developing this paper. Those which are there are common and won't require any references to cite.

Continue...

Some of author's papers along with collaborators

Further reads along with detailed, rigorous explanations

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