Planar Yang-Mills 101

Nicholas R. Steinert Wright

Natchitoches, Louisiana, USA

wnicholas2222@yahoo.com

Abstract

The point is to define the limiting continuum field theory. In principle, this might even be done without taking limits. The Hamiltonian, the operator on the quantum Hilbert space which generates time translations, has a square root called the supercharge. Here we use the Moon model and Parfait logic. Furthermore, although one has changed the problem, one still has a fairly close relation to the original problem using the ideology of the renormalization group. We can start with a supersymmetric theory, and add supersymmetry breaking terms to the action which only become important at long distances as many lattice spacings, to obtain a theory with the better renormalization properties of the supersymmetric theory at short distances, but which reduces to conventional Yang-Mills theory at longer distances. Thus, a solution to the problem in a sufficiently general class of supersymmetric theories, would in fact imply the solution of the original problem. We propose a Cacace tetraoxygen universe relative to a Poincaré Dodecahedral Space. This is called an oxozone.

Keywords: Yang-Mills, mass gap, Moon model, Parfait, Poincaré Dodecahedral Space, core-cusp problem, dwarf galaxy problem

Introduction

Given a simple Lie Group G (such as SU (2) or SU (3)). Show that:

A. There exists a fully renormalized quantum version of Yang-Mills theory on R^4 based on this group, and

B. There is a number $\Delta > 0$ such that every state in the theory (except the vacuum) has energy at least Δ. In other words, there are no massless particles in the theory.

Using the Bohm interpretation (pilot-wave theory) R^3 as a sanity check we move on to algebras. There is an important difference between Clifford algebra and Stein algebra that is imperative that we use the former. Clifford algebra and its manifolds have antisymmetric matrices on a duality basis while Stein algebra and it manifolds have a fundamental vector field on a standard basis. This is noted by Stein manifolds relation to real numbers. Clifford manifolds are relative to complex numbers. Space-time algebra can utilize both tori, but abelian algebra must use Clifford tori. Furthermore, Clifford algebra as a degenerate scalar product projects distance measurements in R^4 onto the R^3 hyperplane. In the orthogonal Clifford algebra, the elements follow an anticommutation rule, with $\omega = -1$, and $p = 2$. It can be considered as an alternative to or a generalization of the curvature tensor in Riemannian geometry. That is because the *goal of flatness* (asymptotically flat) for Stein manifolds are $\Omega = 0$, whereas Clifford manifolds are $\Omega > 0$. We express this as Stein's law: If something cannot go on forever, it will stop.

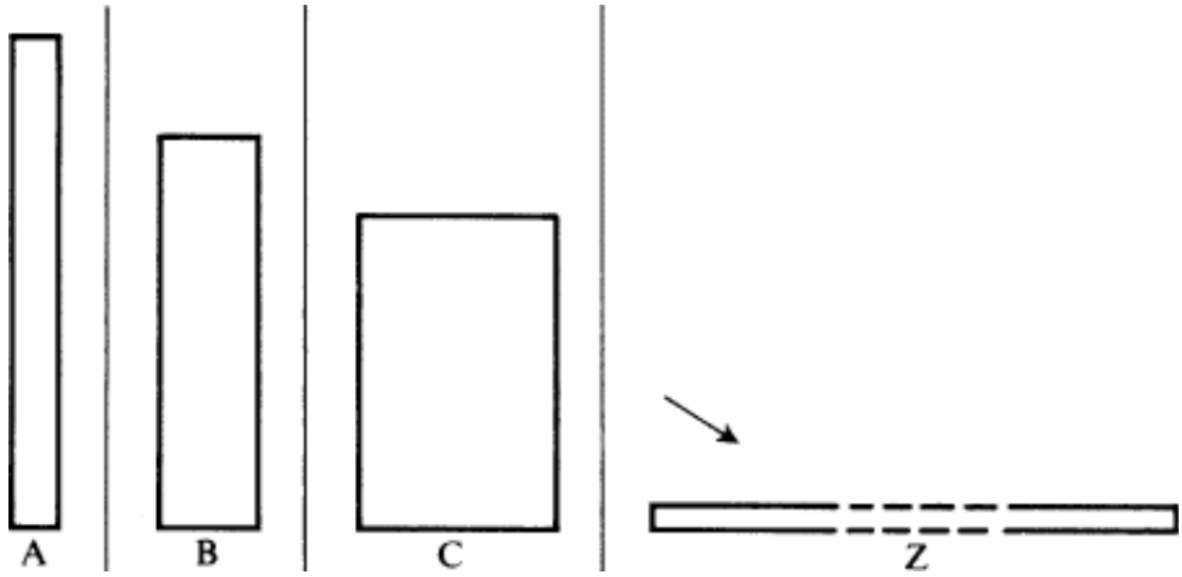
Establishing a quantum mechanical Hilbert space is part of the solution to this Millennium problem. The Ising model is solvable for four-dimensional supersymmetric Yang-Mills theories. In dimensions greater than four, the phase transition of the Ising model is described by mean field theory. Mathematically, the Willmore energy on Clifford space (C-space) is defined on the Ising model to be the integral of the square of the mean curvature minus the Gaussian curvature and becomes equivalent to the Yang-Baxter equation. Using the transfer-matrix method, one hopes to find the quartic potential as an interesting number. In searching for a reliable model to show duality transformation, we use the Moon model and topological quantum field theory (TQFT). We prove validity by using the matrix inversion method. The building of such a model is demonstrated using the Clifford torus such that: $R^4 \rightarrow T^4 = 4 \text{ x } 4 = 16R = 12S - 1S = 11$ dimensions in a string coupling constant without fermions due to the absence of a D6-brane (unless they are dark matter, making them a cut-off). Aside from the vacuum there are no states of energy larger than d. The foliation of the state of the system leads to eventual quantum implementation.

We answer several questions in this paper on quantum physics and mathematics:

1. Mass gap— Why are nuclear forces short-range? Why are there no massless gauge particles?
2. Confinement— Why don't we see bare quarks? Is it compatible?
3. QFT— Treatment so far is quantum mechanics, how do we incorporate quantum field theory?

Yang-Mills Parfait

The answer to Yang-Mills relies on finding a solution to the double-slit experiment (DSE). We attempt to establish such a solution by utilizing similar results in constructive quantum field theory for the realistic case $d = 4$. We lead a new mathematical framework for a supersymmetric extension of four-dimensional gauge theory known as Derek Parfait's repugnant conclusion, or variously known as the mere addition paradox (1984). Illustrated:



The purpose of the paradox is to show comparisons of value as a strongly coupled lattice gauge theory. It shows that group B is no worse off than group A despite having less value and a greater population (displayed by height and width). The argument is infinite. Thus, there is a paradox. The following intuitively plausible claims are jointly incompatible: (a) that B is no worse than A, (b) that C is better than B, (c) that C is equally as good as Z, and (d) that Z can be worse than A. The conclusion we're left with is that $Z > C > B > A$, and, accordingly, that $Z > A$. The paradox is directly congruent to Sorites paradox. If one

replaces the h property with asymptotic freedom and the w property to quark confinement, the paradox is comparable to the Yang-Baxter equation. The price of altruism (principle of bivalence) is comparable to chiral symmetry breaking - the current algebra theory of soft pions. We compare this to the mass gap as argued at a heuristic level. Including truth value of the *differential cross section* and the contradiction of the *total cross section*, this theory describes both the electromagnetic and weak forces, in a more or less unified way; because of the reduction of the structure group to U(1), the long-range fields are those of electromagnetism only, in accord with what we see in nature. If you were a fly on the wall, you would see the positive energy is $0 \leq H$, and a vacuum vector $\Omega \in H$ that is unique up to a phase. The Higgs mechanism for the electroweak theory is based on an exponentially negative symmetry (self-actualization), relative to the Euclidean action functional. The non-abelian gauge theory of the strong force is called Quantum Chromodynamics (QCD). The fundamental solution of perturbative bosonic strings therefore becomes the parametrization of Moduli space, which is non-trivial for genus $h \geq 4$.

The basic idea should also be regarded as a black hole in diffusion and Brownian motion relative like a fluctuation-dissipation relation (FDR). Thus the mass gap has a physical significance and it is important in mathematical applications of four-dimensional quantum gauge theories and geometry. In addition the existence of a uniform gap for finite-volume approximations plays a fundamental role in the proof of existence of the infinite-volume limit. Given the detailed balance: $A_1 - A_2 - A_3 - A_1 = J = 0$, a Type IIB string theory interpretation of the theory is the worldvolume theory of a stack of D3-branes. The present method demonstrates how to obtain the existence of the infinite volume limit $T^4 \to R^4$.

Three summaries should be expounded before moving onto the matrix inversion. First, fundamental interaction forces are represented by the mere addition paradox 4-vector fixed points. One should expect gravity waves therein represented by the Hamiltonian operator square root. We call these the quanta and qualia or variously as seed gravity, momenta, and high energy quanta. The goal being to find a fundamental length F. Therefore, we adhere to Pauli's conjecture of realistic regularization with minimal renormalization to standardize the paradox. Moreover, our observation tells us that this mixture looks like a proper quantum ensemble in a measurement situation, as we observe that measurements lead to the realization of precisely one state in the ensemble.

Second, the propagator is given by Green's function L for a fundamental solution F. Physical quantities come in pairs as conjugate quantities. Energy is related to frequency, momentum is related to wavelength. Therefore, coupled with a random walk, we can say either the paradox is conformal or it is bootstrapped where $c' \leq b$ and $n' \leq n$. In the three-dimensional case one also needs to normalize vectors in the Fock space as a constant that diverges with k by running the coupling; one calls this constant a wave-function renormalization constant. There is the suggestion that the energy momentum four-vector is also a 4-entropy vector. This quartic interaction is variously known as synergy and imaginary time.

Third, the no-cloning theorem should be renamed the *nuclear theorem*. It is already quantum according to the repugnant conclusion. Furthermore, the impossibility of superluminal communication based on the no-broadcasting theorem gives us a G = G-structure inverse. This does one of two things. It satisfies the assumption of the Coleman-Mandula theorem and the Wightman axioms. The paradox become solitonic throughout leading to a possible solution to gluon-ball existence. Despite the holomorphic principle we call this Coulomb's law.

Matrix Inversion

We obtain an invertible matrix similar to a Black hole $I_n = (-1)B = \Lambda^{-1}$. This is because both ethical logic and quantum logic require an etic perspective. We also find that a matrix inversion such as this is conformal to the ΛCDM model. The ΛCDM model is also known as the standard model of cosmology, but is not related to the Standard Model of particle physics. As a result, theorists have taken up more radical approaches to the problem of quantum gravity, the most popular approaches being string theory and loop quantum gravity (LQG). We combine a Poincaré Dodecahedral Space with ΛCDM concordance cosmology, the entire evolution being unitary with a unitary time evolution. Being unitarily equivalent, path integral formulation and quantum tunneling leads to black holes. The importance of this hybrid model is how it solves the problem of time. General relativity (GR) + the Theory of Everything (TOE) + Quantum mechanics – Big Bang theory = the thermal time hypothesis.

Moon model

Given the thermal time hypothesis and the Poincaré Dodecahedral Space we are able to create the Moon model. This is not to be confused with modified Newton gravity (MOND). However, gravity is an important variable in the Moon model. The Quintom scenario marries tensor–vector–scalar gravity (by quintessence) and scalar–tensor–vector gravity (STVG) (by phantom energy). These and F(R) gravity theories equate to modified Newton gravity (MOND) which is proved wrong. Instead, we add strong or extreme gravity into a Grand Unified Theory (GUT). We call this the *Law of Conservation of Extreme Grav*. The law is equivalent to what has been variously called massive gravity and Yang-Mielke theory of gravity. It is represented as Q^2. This has been historically called the axis of the universe where gravity goes toward. Although more research must be developed in that direction, we only look at its relation to monogamy of entanglement and black hole complementarity. This is evident from the ER = EPR conjecture. This is a further argument for quantum reversibility in our flat universe also known as the black hole information paradox. Considering the continents have recycled in some places and the pigmentation in skin has evolved up to three times, it wouldn't be farfetched to say that the Universe and whatever we consider the pigmentation of this Universe to have recycled or evolved their self as well.

The local realism of black hole recycling implies the information and entropy is absorbed into the stretched horizon which acts like a dissipative fluid with entropy, viscosity and electrical conductivity.

The turning point comes with fuzzball string theory. Fuzzball theory leads to compact directions and space-time foam. Plus the recent foundation of AMPS firewall of extra dimensions also known as the Hawking apparent horizon or Einstein-Rosen bridge wormholes add more structure. Quantum complementarity/black hole complementarity is the answer to the cosmological constant problem. A cosmological constant has negative pressure, $p = -\rho c^2$, which contributes to the stress-energy tensor that, according to the general theory of relativity, causes accelerating expansion. Moreover, dark matter $= \rho \propto a^{-3}$, radiation redshift $= \rho \propto a^{-4}$, and dark energy $= \rho \propto a^0$. We find a *Dark Matter Halo* to exist as a diagonal line because every piecewise linear is a piecewise differential. Thus, physical information is not lost in black holes.

Topological defects

Two topological defects were discovered when using the two models and inversion. The first being the cuspy halo problem also known as the core-cusp problem. It is not a problem, nor a paradox. It is the Unruh effect on N-body simulation. The Unruh effect of blackbody radiation observation is observer reliant and self-interacting controlled. Applied to the cusp-core problem, one would theoretically discover a *core inflation* rather than an eternal inflation due to potential difference. In layman's terms it is an ionic bond.

The second topological defect is the dwarf galaxy problem also known as the missing satellites problem. The problem has to do with existence. It is the Gibbons-Hawking effect on cosmological simulation. The Gibbons-Hawking effect of causal horizons presumes a temperature therein. Applied to the missing satellites problem one notes three observations: Gibbons and Hawking presume we live in a multiverse, the universe travels faster than the speed of time most of the time, or the effect only applies to galactic matter and not more than the visible universe (read: *galactic rebate*). In layman's terms it is a covalent bond. However it should be noted that the dwarf galaxy is under divergent strains due to superposition property. The divergences being space and time, perhaps even dark galaxies and the observable universe.

Nonetheless, given the Yule-Simpson effect, we examine a *Quirkless Galaxy (Q^2)*.

Dimensional Analysis

One must take an Archimedean point-of-view when conducting dimensional analysis due to the reliance on Platonic solids rather than Archimedean solids especially when it comes to the Moon model. Without loss of generality, we prove the Moon model of cosmology

through the Modularity theorem. We show a Super-Classical Einstein-Standard Model program:

1. Ribet's theorem implies Gibbons-Hawking effect, Super-Quantum Einstein-Standard Model (SQESM).
2. Geodesic incompleteness implies Unruh effect, Super-Classical Einstein-Standard Model (SCESM).
3. No cube can be written as a sum of two coprime n-th powers $n \geq 3$ implies Hartle-Hawking state. Thus, curvature F is a reasonable infinite dimensional super-sympletic manifold.
4. Poincaré Dodecahedral Space implies positivity violated by T-symmetry.
5. Comparing Stein manifold and Clifford manifold implies Einstein-Standard Model (ESM) to Quantum-Standard Model (QSM).
6. Parfait's groups (we'll call 'barn-like bions') cause a cancellation of nonlinear and dispersive effects in the medium leading to solitons.
7. Only the magnetic quantum field is complete implies electromagnetism is a gauge theory.

We combine quantum field theory, quantum electrodynamic theory, and thermal time hypothesis to obtain quantum geometrodynamics (QG). QG is one and the same as the Moon model. From here we propose the theory of an *oxozone (tetraoxygen) universe*. That is, an O_4 shaped universe consisting of two dumbbell-like O_2 molecules loosely held together by induced dipole dispersion forces as suggested by Fulvio Cacace in 2001. It follows that a phosphate ion would link up to the oxygen molecules causing luciferin and luciferase. This was studied by Matthew Fisher in 2015. It would also align with Roger Penrose's orchestrated objective reduction (Orch-OR).

Conclusion

We prove the Yang-Mills existence and mass gap. The process required three known models and two solution formulas that were previously unknown. Namely, the Parfait bions, the Moon model, and the Poincaré Dodecahedral Space. In jest, the two solution formulas were the cuspy halo problem and the dwarf galaxy problem. Parfait bions are quite useful and can be understood as relational concepts mediated by a postmodern construction of power. Essentially, all directions beyond QED lead to a sort of quantum prisoner's dilemma. Thus, we propose a direction facing universe where one face is calm and the other face is hydrostatic. Both sides are nuclear fusion engines known together as a Cacace tetraoxygen universe. It is relative to Poincaré Dodecahedral Space. Summed up, this puts blackhole universe theory against fuzzball theory. Both theories are said to be correct and both have strengths in formulas of equilibrium, symmetry, and gravity distortion. However certain continua are to be expected. We label such continua Q^2. We propose this leads to a recombination conclusion. At this final point, the importance of

Clifford tori as curvature forms cannot be underestimated. By reverse engineering a solution to explain the mechanism of the radiation process we find that space-time remains primal in the universe. Your very personality (quantum brain) is a direct bestowal of space-time. If true it can be said that it is not only Dark Matter that holds everything together, but also Derek Parfait.

Conflict of Interest

The author claims no conflict of interest.

References

A. Connes, C. Rovelli, “Von Neumann Algebra Automorphisms and Time-Thermodynamics Relation in General Covariant Quantum Theories”, Class.Quant.Grav. 11:2899–2918, 1994.

Almheiri, Ahmed; Marolf, Donald; Polchinski, Joseph; Sully, James (11 February 2013). "Black holes: complementarity or firewalls?". Journal of High Energy Physics. 2013 (2). arXiv:1207.3123 Freely accessible. Bibcode:2013JHEP...02..062A. doi:10.1007/JHEP02(2013)062.

Arthur Jaffe and Edward Witten “Quantum Yang-Mills theory.” Official problem description.

Atas, Y. Y. & Bogomolny, E. (2014). Spectral density of the quantum Ising model in two fields: Gaussian and multi-Gaussian approximations. arXiv:1402.6858 [math-ph]

Burgess, C. P., Grandi, N. E., Quevedo, F., & Rabadan, R. (2003). D-Brane chemistry. JHEP0401:067, 2004. arXiv:hep-th/0310010 DOI: 10.1088/1126-6708/2004/01/067

Cacace, Fulvio (2001). "Experimental Detection of Tetraoxygen". Angewandte Chemie International Edition. 40 (21): 4062. doi:10.1002/1521-3773(20011105)40:21<4062::AID-ANIE4062>3.0.CO;2-X.

Dynin, A. (2013). Mathematical quantum Yang-Mills theory revisited. Russian .J. Math. Physics 24 (2017) 26. arXiv:1308.6571 [math-ph] DOI: 10.1134/S1061920817010022

Fisher, M. (2015). Quantum cognition: The possibility of processing with nuclear spins in the brain. Annals of Physics, 362, November 2015, 593-602. https://doi.org/10.1016/j.aop.2015.08.020

Gomez, C., Gunnesson, J., & Hernandez, R. (2007). The Ising model and planar N=4 Yang-Mills. J.Phys.A41:275205,2008. arXiv:0711.3404 [hep-th] DOI: 10.1088/1751-8113/41/27/275205

Hawking, Stephen (22 Jan 2014). "Information Preservation and Weather Forecasting for Black Holes". arXiv:1401.5761

Hecht, Laurence; Stevens, Charles B. (Fall 2004), "New Explorations with The Moon Model" (PDF), 21st Century Science and Technology, p. 58

Parfait, D. (1984). Reasons and Persons. Oxford University Press.