Bohm Quantum Blockchain
and
Indra's Net with Schwinger Source Jewels

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Abstract

E8 Physics (viXra 1602.0319 and 1701.0495 and 1701.0496)
is based on 26D String Theory with Strings interpreted as World-Lines
and spin-2 carriers of Bohm Quantum Potential with Sarfatti Back-Reaction
and an Indra's Net with each Indra's Jewel being a Schwinger Source.
Each Schwinger Source contains about 10^27 virtual particle/antiparticle pairs
and interacts with the rest of our Universe through 8 x 10^53 elements of the
Monster automorphism group of each 26-dim String Theory cell modulo a Leech lattice
so each Schwinger Source can contain full Blockchain information
about 10^27 x 8 x 10^53 = 8 x 10^80 other Schwinger Sources in our Universe
which is enough capacity to act as an Indra's Jewel Blockchain Block for our Universe.

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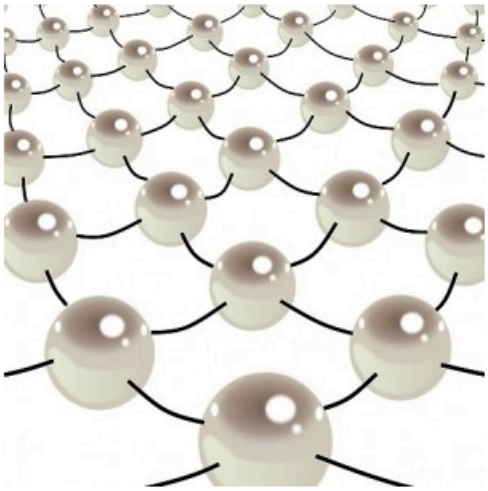
Indra’s Net

“... "Indra's net" is the net of the Vedic deva Indra, whose net hangs over his palace on Mount Meru, the axis mundi of Buddhist and Hindu cosmology. In this metaphor, Indra's net has a multifaceted jewel at each vertex,
and each jewel is reflected in all of the other jewels ...
the image of "Indra's net" is used to describe the interconnectedness of the universe ...
Francis H Cook describes Indra's net thus:
“Far away in the heavenly abode of the great god Indra, there is a wonderful net ...
a single glittering jewel in each "eye" of the net ... in ... each of the jewels ...
its polished surface ... reflect[s] all the other jewels in the net ... Not only that, but each of the jewels reflected in this one jewel is also reflecting all the other jewels ...” “.

Image from https://brightwayzen.org/meetings-placeholder/indras-net-honoring-interdependence-scales/ :

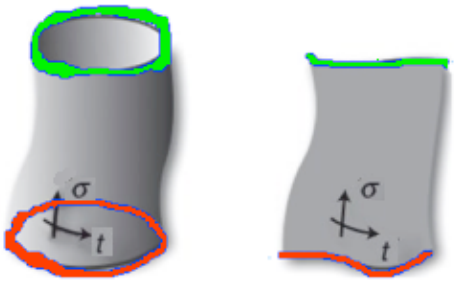


In realistic E8 Physics (viXra 1602.0319 and 1701.0495 and 1701.0496)
e**ach Indra Jewel is a Schwinger Source**.

E8 Physics - 26D J(3,O)o String Theory - Bohm Quantum Potential

To understand **Schwinger Sources of E8 Physics start with 26D String Theory**:
interpret **Strings as World-Lines** of Particles and
spin-2 String Theory 24x24 symmetric matrices
as carriers of Bohm Quantum Potential (not gravitons).

Luis E. Ibanez and Angel M. Uranga in "String Theory and Particle Physics" said:
"... String theory proposes ... small one-dimensional extended objects, strings,
of typical size Ls = 1/ Ms, with Ms known as the string scale ...
As a string evolves in time, it sweeps out a two-dimensional surface in spacetime,
known as the worldsheet, which is the analog of the ... worldline of a point particle ...
for the bosonic string theory ... the classical string action is the total area spanned by
the worldsheet ... This is the ... Nambu– Goto action ...".



(images adapted from "String Theory and Particle Physics" by Ibanez and Uranga)

In my unconventional view the red line and the green line are different strings/
worldlines/histories and the world-sheet is the minimal surface connecting them,
carrying the Bohm Potential.

The t world-sheet coordinate is for Time of the string-world-line history.
The sigma world-sheet coordinate is for Bohm Potential Gauge Boson at a given Time.
Further, Ibanez and Uranga also said:
"... The string groundstate corresponds to a 26d spacetime tachyonic scalar field T(x).
This tachyon ... is ... unstable
...
The massless two-index tensor splits into irreducible representations of SO(24) ...
Its trace corresponds to a scalar field, the dilaton **ϕ**, whose vev fixes the string
interaction coupling constant gs
...
the antisymmetric part is the 26d 2-form field BMN
...
The symmetric traceless part is the 26d graviton GMN ...".

My interpretation of the symmetric traceless part
differs from that of Ibanez and Uranga in that it
is the carrier of the Bohm Quantum Potential.

Closed string tachyons localized at orbifolds of fermions produce virtual clouds of particles / antiparticles that dress fermions.

Dilatons are Goldstone bosons of spontaneously broken scale invariance that (analagous to Higgs) go from mediating a long-range scalar gravity-type force to the nonlocality of the Bohm-Sarfatti Quantum Potential.

The antisymmetric SO(24) little group is related to the Monster automorphism group that is the symmetry of each cell of Planck-scale local lattice structure.

Joe Polchinski in "String Theory, Volume 1, An Introduction to the Bosonic String" said:
"... we find at m^2 = - 4 / alpha' the tachyon,
and at m^2 = 0 the 24 x 24 states of the graviton, dilaton, and antisymmetric tensor ...".

My interpretation of what Polchinski describes as the graviton
differs from that of Polchinski in that it
is the carrier of the Bohm Quantum Potential.

The 24x24 Real Symmetric Matrices form the Jordan Algebra J(24,R).
Jordan algebras correspond to the matrix algebra of quantum mechanical states,
that is, from a particle physics point of view,
the configuration of particles in spacetime upon which the gauge groups act.
24-Real-dim space has a natural Octonionic structure of 3-Octonionic-dim space.
The corresponding Jordan Algebra is J(3,O) = 3x3 Hermitian Octonion matrices.
Their 26-dim traceless part J(3,O)o describes the 26-dim of Bosonic String Theory and the algebra of its Quantum States, so that

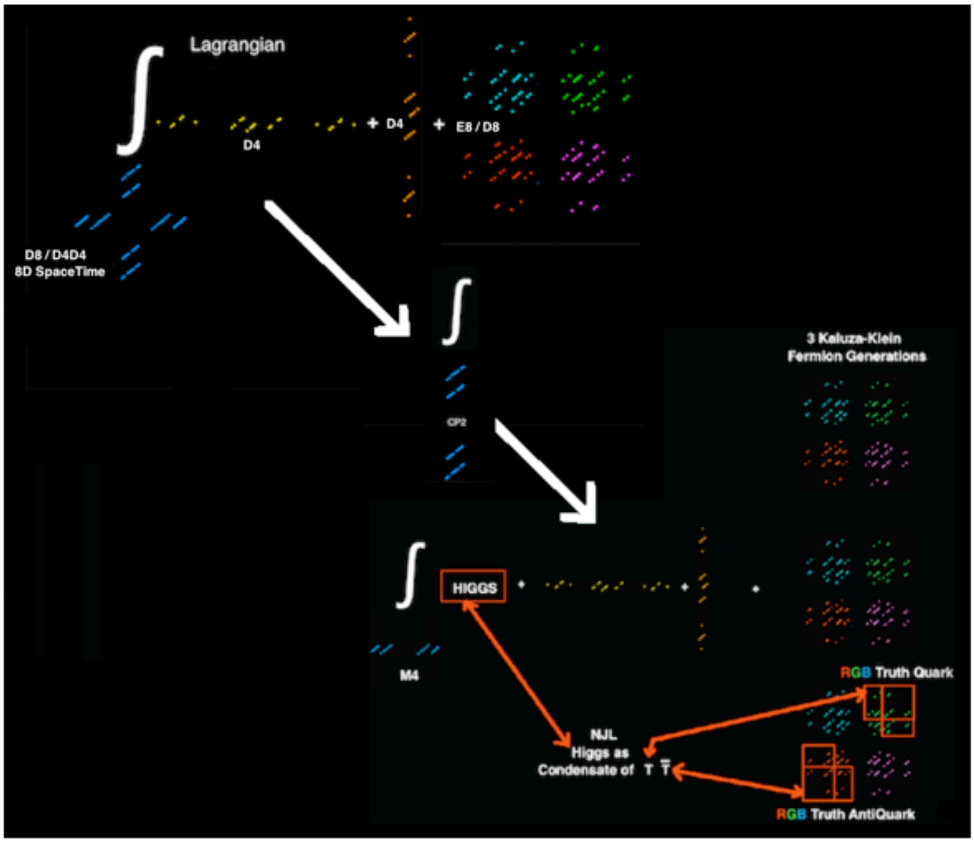
the 24x24 traceless symmetric spin-2 particle is the Quantum Bohmion
that carries the Bohm Quantum Potential
for interactions among Strings = World-Line Histories of Schwinger Sources.

E8 Physics - 26D J(3,O)o String Theory - Lagrangian Structure

The 26-dim traceless part J(3,O)o of 27-dim Jordan Algebra J(3,O)
gives a realistic Lagangian. J(3,O)o has
2 of its 3 Octonion parts as 8+8=16-dim representation of 8 first-gen Fermions
and
26-16 = **10-dim as String Theory spacetime** that decomposes into
Kaluza-Klein **6-dim Conformal space of Spin(2,4) x 4-dim CP2** = SU(3) / SU(2)xU(1)
which then gives **4-dim M4 x 4-dim CP2 Kaluza-Klein**.
The conformal Spin(2,4) gives Gravity via MacDowell-Mansouri

The CP2 gives Standard Model SU(3) x SU(2) x U(1) via Batakis

Decomposition to M4 x CP2 Kaluza-Klein gives Higgs via Mayer-Trautman
and
gives 2nd and 3rd generations of fermions.



26-dim J(3,O)o represents Lie Algebra F4 - Two copies of F4 give E8 Physics

F4 lives in the Real Clifford Algebra Cl(8) as
52-dim F4 = 8-dim Vectors of Cl(8) + 28-dim D4 BiVectors of Cl(8) + 16-dim D4 Spinors
16-dim D4 Spinors of F4 can be represented by anti-commutators and commutators
(via Ramond and viXra 1208.0145) so they can physically represent Fermions.

By 8-Periodicity of Real Clifford Algebras the tensor product Cl(8) x Cl(8) = Cl(16).
E8 lives in the Real Clifford Algebra Cl(16) as
248-dim E8 = 120-dim D8 BiVectors of Cl(16) + 128-dim D8 Half-Spinors

Label the two copies of Cl(8) as Cl(8)sm and Cl(8)grav because

Cl(8)sm contains F4sm and D4sm with subalgebra SU(3) of Standard Model
as well as ghosts of Conformal Gravity
and
Cl(8)grav contains F4grav and D4grav with subalgebra Spin(2,4) of Gravity
as well as ghosts of Standard Model

120-dim D8 of E8 = 28-dim D4sm x 1grav + 1sm x 28-dim D4grav + 8vsm x 8vgrav

64-dim 8vsm x 8vgrav = 63-dim A7+1
where A7 = SL(8,R) of UniModular 8-dim Spacetime

256-dim D8 Spinors = (8+hspD4grav + 8-hspD4grav) + (8+hspD4sm + 8-hspD4sm) =
= (8+hspD4grav x 8+hspD4sm + 8+hspD4grav x 8-hspD4sm) +
+ (8-hspD4grav x 8+hspD4sm + 8-hspD4grav x 8-hspD4sm)
so
since the D4grav Half-Spinors determine whether D8 Half-Spinors
represent normal (8+hspD4grav) or mirror (8-hspD4grav) Fermions
since E8 only contains normal Fermions

128-dim D8 Spinors = 8+hspD4grav x (8+hspD4sm + 8-hspD4sm)
= (8+hspD4grav x 8+hspD4sm + 8+hspD4grav x 8-hspD4sm)
= 8 components of 8 Gen1 Fermion Particles +
+ 8 components of 8 Gen1 Fermion Anti-Particles

Decomposition to M4 x CP2 Kaluza-Klein
gives 2nd and 3rd generations of Fermions
and **gives Higgs via Mayer-Trautman**
and **gives Standard Model SU(2)xU(1) via Batakis from CP2 = SU(3) / SU(2)xU(1)**

E8 Physics - 26D J(3,O)o String Theory - Schwinger Sources

To understand **Schwinger Sources of E8 Physics start with 26D String Theory**:
interpret **Strings as World-Lines** of Particles and
spin-2 String Theory things as carriers of Bohm Quantum Potential (not gravitons).

Fock "Fundamental of Quantum Mechanics" (1931) showed that it requires
Linear Operators "... represented by a definite integral [of a]... kernel ... function ...".

Hua "Harmonic Analysis of Functions of Several Complex Variables in the Classical Domains" (1958) showed Kernel Functions for Complex Classical Domains.

Schwinger (1951 - see Schweber, PNAS 102, 7783-7788) "... introduced a description in terms of Green's functions, what Feynman had called propagators ... The Green's functions are vacuum expectation values of time-ordered Heisenberg operators, and the field theory can be defined non-perturbatively in terms of these functions ...[which]... gave deep structural insights into QFTs; in particular ... the structure of the Green's functions when their variables are analytically continued to complex values ...".

Wolf (J. Math. Mech 14 (1965) 1033-1047) showed that the Classical Domains
(complete simply connected Riemannian symmetric spaces)
representing 4-dim Spacetime with Quaternionic Structure are:
S1 x S1 x S1 x S1 = 4 copies of U(1)
S2 x S2 = 2 copies of SU(2)
CP2 = SU(3) / SU(2)xU(1)
S4 = Spin(5) / Spin(4) = Euclidean version of Spin(2,3) / Spin(1,3)

Armand Wyler (1971 - C. R. Acad. Sc. Paris, t. 271, 186-188) showed how to use
Green's Functions = Kernel Functions of Classical Domain structures characterizing
Sources = Leptons, Quarks, and Gauge Bosons,
to calculate Particle Masses and Force Strengths
(for results of E8 Physics Wyler-type calculations see Appendix of this paper)

Schwinger (1969 - physics/0610054) said: "... operator field theory ... replace[s] the particle[s] with ... small volumes of three-dimensional space ...
The properties of the particle ... remain the same ...
We introduce a quantitative description of the particle source in terms of a source function ... we do not have to claim that we can make the source arbitrarily small ...
The basic things are ... the source functions ...
describing the intermediate propagation of the particle ...".

Schwinger Sources as described above are continuous manifold structures
of Bounded Complex Domains and their Shilov Boundaries
but
the E8 model at the Planck Scale has spacetime forming a Leech lattice
underlying 26-dim String Theory of World-Lines

with 8 + 8 + 8 = 24-dim of fermion particles and antiparticles and of spacetime.

The automorphism group of a single 26-dim String Theory cell modulo the Leech lattice is the Monster Group of order about 8 x 10^53.

When a fermion particle/antiparticle appears in E8 spacetime it does not remain a single Planck-scale entity becauseTachyons create a cloud of particles/antiparticles.

The cloud is one Planck-scale Fundamental Fermion Valence Particle plus an effectively neutral cloud of particle/antiparticle pairs forming a Kerr-Newman black hole.

That cloud constitutes the Schwinger Source.

Its structure comes from the 24-dim Leech lattice part of the Monster Group which is 2^(1+24) times the double cover of Co1, for a total order of about 10^26.

Since a Leech lattice is based on copies of an E8 lattice and since there are 7 distinct E8 integral domain lattices there are 7 (or 8 if you include a non-integral domain E8 lattice) distinct Leech lattices. The physical Leech lattice is a superposition of them, effectively adding a factor of 8 to the order of the Schwinger Source, so that
the volume of the Kerr-Newman Cloud is on the order of 10^27 x Planck scale.
Therefore,
the Kerr-Newman Cloud should contain about 10^27 particle/antiparticle pairs
and its size should be about 10^(27/3) x 1.6 x 10^(-33) cm = roughly 10^(-24) cm.

Each of those particle-antiparticle pairs should see (with Bohm Potential)
the rest of our Universe in the perspective of 8 x 10^53 Monster Symmetry
so

a single Schwinger Source acting as a Jewel of Indra's Net should see / reflect 10^27 x 8 x 10^53 = 8 x 10^80 Other Schwinger Source Jewels of Indra's Net which is consistent with the number of Schwinger Sources in our Universe.

Blockchain Structure of Bohm Quantum Potential

Andrew Gray in arXiv quant-ph/9712037 said:

"... probabilites are ... assigned to entire fine-grained histories ...
base[d] ... on the Feynman path integral formulation ..."

so **in E8 Physics the Indra's Net of Schwinger Source Jewels**
would not have Bohm Quantum Potential interactions between two Jewels,
rather **the interactions would be between the two entire World-Line History Strings**

(image adapted from http://www.blockchaintechnologies.com/)

According to https://hbr.org/2017/01/the-truth-about-blockchain "... **How Blockchain Works ...**

1. Distributed Database
Each party on a blockchain has access to the entire database and its complete history. No single party controls the data or the information. Every party can verify the records of its transaction partners directly, without an intermediary.

2. Peer-to-Peer Transmission
Communication occurs directly between peers instead of through a central node.
Each node stores and forwards information to all other nodes.

3. Transparency with Pseudonymity
Every transaction and its associated value are visible to anyone with access to the system. Each node, or user, on a blockchain has a unique 30-pluscharacter
alphanumeric address that identifies it. Users can choose to remain anonymous or provide proof of their identity to others. Transactions occur between blockchain addresses.

4. Irreversibility of Records
Once a transaction is entered in the database and the accounts are updated, the records cannot be altered, because they're linked to every transaction record that came
before them (hence the term "chain"). Various computational algorithms and approaches are deployed to ensure that the recording on the database is permanent, chronologically ordered, and available to all others on the network.

5. Computational Logic
The digital nature of the ledger means that blockchain transactions can be tied to computational logic and in essence programmed. So users can set up algorithms and rules that automatically trigger transactions between nodes. ...".

With respect to Bohm Quantum Potential of E8 Physics Schwinger Sources
there is no Human directly controlling any Event / Interaction / Transaction,
as they are all completely controlled by the Laws of Physics which
define “algorithms and rules that automatically trigger transactions between nodes” .

Each Node is a Schwinger Source that is connected by Bohm Quantum Potential
to all other Schwinger Source Nodes in our Universe
and governed by the “algorithms and rules” of the E8 Physics Lagrangian
and the Algebraic Quantum Field Theory arising from
the completion of the union of all tensor products of copies of Cl(16)
each copy of Cl(16) containing E8 and the E8 Lagrangian.

Acording to http://www.blockchaintechnologies.com/ “... A blockchain is a type of distributed ledger, comprised of unchangable, digitally recorded data in packages called *blocks*. These digitally recorded "blocks" of data is stored in a linear *chain ...*

... A distributed ledger is a consensus of replicated, shared, and synchronized digital data geographically spread across multiple sites, countries, and/or institutions ...”

or, in the case of the E8 Physics Indra’s Net of Schwinger Source Jewels,
spread across the entirety of our Universe.

Appendix - Results of E8 Physics Calculations

Here is a summary of E8 Physics model calculation results. Since ratios are calculated, values for one particle mass and one force strength are assumed. Quark masses are constituent masses. Most of the calculations are tree-level, so more detailed calculations might be even closer to observations.

Dark Energy : Dark Matter : Ordinary Matter = 0.75 : 0.21 : 0.04

Fermions as Schwinger Sources have geometry of Complex Bounded Domains with Kerr-Newman Black Hole structure size about 10^(-24) cm.

Particle/Force	Tree-Level	Higher-Order
e-neutrino	0	0 for nu_1
mu-neutrino	0	9 x 10^(-3) eV for nu_2
tau-neutrino	0	5.4 x 10^(-2) eV for nu_3
electron	0.5110 MeV	
down quark	312.8 MeV	charged pion = 139 MeV
up quark	312.8 MeV	proton = 938.25 MeV
		neutron - proton = 1.1 MeV
muon	104.8 MeV	106.2 MeV
strange quark	625 MeV	
charm quark	2090 MeV	
tauon	1.88 GeV	
beauty quark	5.63 GeV	
truth quark (low state)	130 GeV	(middle state) 174 GeV
		(high state) 218 GeV
W+	80.326 GeV	
W-	80.326 GeV	
W0	98.379 GeV	Z0 = 91.862 GeV
Mplanck	1.217x10^19 GeV	
Higgs VEV (assumed)	252.5 GeV	
Higgs (low state)	126 GeV	(middle state) 182 GeV
		(high state) 239 GeV
Gravity Gg (assumed)	1	
(Gg)(Mproton^2 / Mplanck^2)		5 x 10^(-39)
EM fine structure	1/137.03608	
Weak Gw	0.2535	
Gw(Mproton^2 / (Mw+^2 + Mw-^2 + Mz0^2))		1.05 x 10^(-5)
Color Force at 0.245 GeV	0.6286	0.106 at 91 GeV

Kobayashi-Maskawa parameters for W+ and W- processes are:

	d	s	b
u	0.975	0.222	0.00249 -0.00388i
c	-0.222 -0.000161i	0.974 -0.0000365i	0.0423
t	0.00698 -0.00378i	-0.0418 -0.00086i	0.999

The phase angle d13 is taken to be 1 radian.