E8 Physics:

from

Fundamental Fermion Dixon Spinors

to

26-dim String World-Line Theory

to

Kerr-Newman Clouds

to

Schwinger Source Regions

to

Wyler/Hua Force Strengths

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The following four pages are an outline sketch of how E8 Physics emerges
from fundamental spinor fermions
to condense into a 26-dim String structure with strings as fermion World-Lines
with each fundamental fermion being surrounded by a Quantum Cloud
that has Kerr-Newman physical structure
corresponding to a Schwinger Source region
with complex harmonic Wyler/Hua Green's function propagator.
The Wyler/Hua complex bounded domain structure allows
realistic calculation of force strength constants and particle masses.

The outline sketch omits many details which are covered in vixra 1108.0027

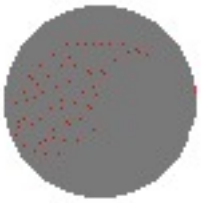
Here are some historical speculation questions:

Could Wyler's Green's function based on harmonic analysis of complex domains
have been used by Schwinger
to give more detailed models of his finite-region sources ?

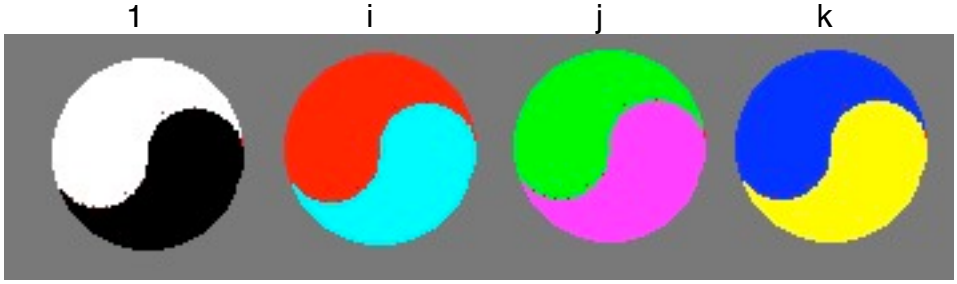
Could Wyler's rejection at IAS Princeton under Dyson in the 1970s
have been at least in part due to Dyson's Feynman-type view
of point particles as fundamental ?

If Wyler had gone to see Schwinger at UCLA instead of Dyson at IAS Princeton
could Wyler and Schwinger together have developed source theory
in great enough detail that its advantages (no renormalization etc)
would have been clear to most physicists ?

In the beginning there was void



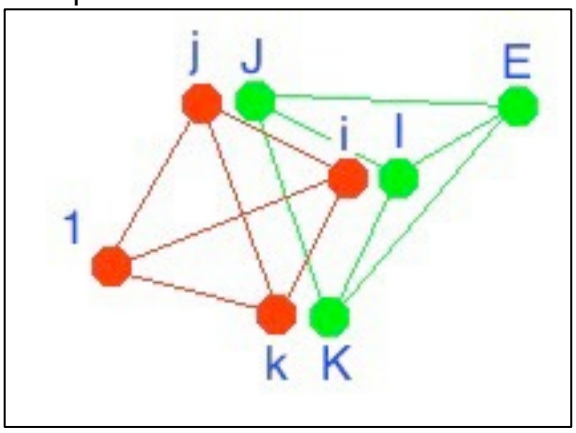
from which emerged yin-yang fermion particle/antiparticle +half-spinor/-half spinor pairs



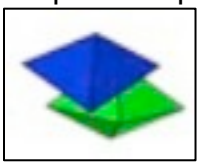
The first pair  corresponds to 1 and E of the Octonion basis {1,i,j,k,I,J,K,E}

The next 3 pairs  correspond to i,I , j,J, k,K

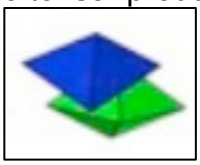
All 8 correspond to a pair of tetrahedra and the 8-dim half-spinors of Cl(8)



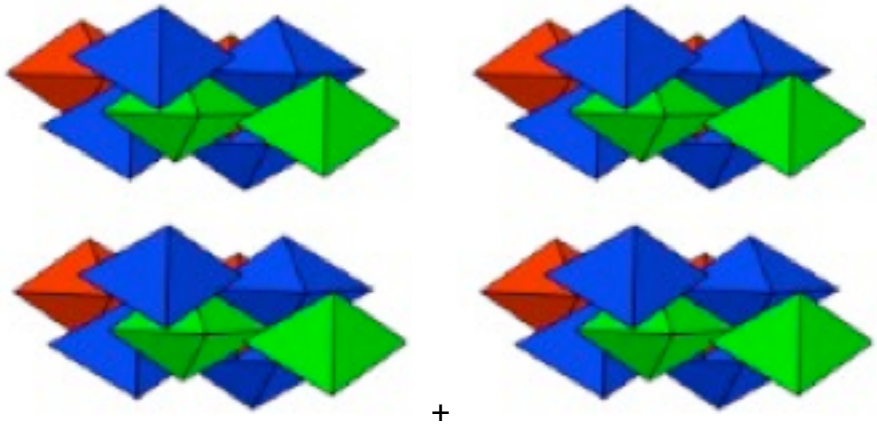
By Real Clifford Algebra 8-periodicity any large spinor space can be embedded in a tensor product of a number copies of the 16-dim full spinors of Cl(8) representable as a pair of a pair of tetrahedra



the tensor product of two of which


x


form the 128+128 = 256-dim full spinors of Cl(8)xCl(8) = Cl(16)



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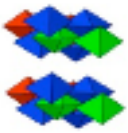
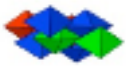


One set of 128-dim Cl(16) half-spinors is the spinor/fermion part of the 248-dim Lie algebra E8 = 120-dim Spin(16) + 128-dim half-spinor of Spin(16) and is also a representation of the 128-dim spinor space denoted as T2 by Geoffrey Dixon who says in his paper "Matter Universe: Message in the Mathematics":
"... the 128-dimensional hyperspinor space T2 ...[is]... the doubling of T ... The algebra T = C x H x O ...(complex algebra, quaternions, and octonions)... is 2x4x8 = 64-dimensional ... noncommutative, nonassociative, and nonalternative ...".

Within 128-dim T2,

each 64-dim factor T is represented by  half of the Spin(16) half-spinor space.
One 64-dim T represents fermion spinor particles
while the other T of T2 represents fermion spinor antiparticles.

How does T2 represent the first-generation fermions seen in experiments ?
Using basis {c1,ci} for C and {q1,qi,qj,qk} for H and {1,i,j,k,E,I,J,K} for O
each T can be decomposed as follows:
{q1,qi,qj,qk} represent { lepton , red quark , green quark , blue quark }
{c1,ci} represent { neutrino / down quark , electron / up quark }
{1,i,j,k,E,I,J,K} represent 8 covariant components of each fermion
with respect to 4+4 = 8-dim Kaluza-Klein Spacetime M4xCP2
with {1,i,j,k} representing 4-dim M4 Minkowski Physical Spacetime
and (E,I,J,K} representing 4-dim CP2 Internal Symmetry Space.

How do T2 fermions interact with each other ?
Consider fermionic 128-dim T2 as the spinor part of E8.
Construct a Local Lagrangian using the 120-dim Spin(16) part of E8
which can be decomposed into
two copies of the 28-dim Spin(8) Lie algebra
plus 64-dim of 8-dim spacetime position x 8-dim spacetime momentum
so that **the Lagrangian density has**
a fermionic term from the T2 spinor space and
gauge boson terms from the two copies of Spin(8)
which are integrated over the 8-dim spacetime as base manifold.

How does the Local Lagrangian Physics extend Globally ?
Since the E8 Lagrangian is Local, it is necessary to patch together Local Lagrangian Regions to form a Global Structure describing a Global E8 Algebraic Quantum Field Theory (AQFT). Each E8 of each region is embedded into Cl(16) and the completion of the union of all tensor products of all the Cl(16) are taken thus producing a generalized **Hyperfinite II1 von Neumann factor Algebraic Quantum Field Theory**.

What is the Physics of World-Line Histories of Particles/Antiparticles ?

8 + 8 + 8 = 24-dim of fermion particles and antiparticles and of spacetime can be represented by a Leech lattice underlying 26-dim String Theory in which strings represent World-Lines in the E8 Physics model.

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.

A fermion particle/antiparticle does not remain a single Planck-scale entity because Tachyons 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 whose 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, and the physical Leech lattice is a superposition of them, effectively adding a factor of 8 to the order.)

The volume of the Kerr-Newman Cloud should be on the order of 10^27 x Planck scale, and **the Kerr-Newman Cloud should contain on the order of 10^27 particle/antiparticle pairs** and **its size should be** somewhat larger than, but roughly similar to, 10^(27/3) x 1.6 x 10^(-33) cm = roughly **10^(-24) cm**.

Kerr-Newman Clouds as Schwinger Sources:
Green's Function Propagators

Schwinger, in Nottingham hep-ph/9310283, said:

"... in the phenomenological **source theory ...**
there are no divergences, and no renormalization ...
the source concept ... is abstracted from the physical possibility of creating or annihilating any particle in a suitable collision. ...
The basic physical act begins with the creation of a particle by a source, followed by the propagation ... of that particle between the neighborhoods of emission and detection, and is closed by the source annihilation of the particle.
Relativistic requirements largely constrain the structure of **the propagation function - Green's function** ...".

Wyler/Hua Complex Domain Structure of Schwinger Sources:
Bergman Kernels and Green's functions

Armand Wyler, in "The Complex Light Cone, Symmetric Space of the Conformal Group" (IAS Princeton, June 1972), said:

"... define the Bergman metric, the invariant differential operators and their elementary solutions (Green functions) in the bounded realization Dn of SO(n,2) / (SO(n) x SO(2) with Silov boundary Qn ...
the value of the structure constant alpha is obtained as coefficient of the Green function of the Dirac equation in D5 ...".