From Minkowski world M to Segal's cosmos D, and a possible role of two more worlds, L and F.

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Segal's Chronometric Theory is "an attempt to apply modern mathematical ideas to the development of a more intelligible and/or exact model for microscopic physical phenomena" ([PaSe-82, p.78]). The chronometric world or spacetime D consists of the Einstein static universe E as the underlying conformal manifold. E is supplied with a standard, general relativistic metric. D is "larger" than Minkowski spacetime M, which can be identified with an open subset of D. D can be represented as R times a three-dimensional sphere S, and the radius *r* of "space" S "provides a natural third fundamental constant, in addition to *h* and *c*, which is required for fundamental physical theory to complete the program suggested by Minkowski [Mi-08] of replacing limiting cases … by mathematically more natural structures."

The universal covering G of the matrix group SU(2,2) acts on D without singularities. The radius *r* of the physical space S does not depend on the metric chosen from the conformal class in question, *r* being a conformal invariant. The chronometric Hamiltonian is the generator of time in E. Relative to each point of observation in D, the Minkowski world M is imbedded P-covariantly, where P is eleven-dimensional Poincare group, a subgroup of G. The relativistic Hamiltonian is the generator of time in M relative to a Lorentz frame in M, which, at the point of observation, osculates the frame defined by the space-time splitting in E. For each unitary positive-energy representation of G, the corresponding chronometric energy exceeds the Minkowski energy by an amount, which vanishes infinitesimally but increases with the spatial support of the state in question in terms of the appropriate quantum mechanical consideration.

In Segal's chronometry the entire list of known particles is derived mathematically. There is just one chronometric particle, the "exon", which has not yet been experimentally identified. Particles are described by respective wave functions, which are sections of certain vector bundles over the spacetime. The "architecture" of the chronometric scalar bundle is determined by a certain conformally covariant second-order differential operator, the "curved wave operator". This bundle together with known finite-dimensional P-representations determines higher spin bundles. The flat wave operator (it corresponds to M) is conformally covariant, too.

The worlds M, D might be viewed as Lie groups. Respective Lie algebras are: an Abelian one for M, whereas the Lie algebra *d* is *u(2).* The metric in the above E is determined by a certain invariant form in *d* . It has been noticed by Levichev [GuLe-84, Le-85] that there are exactly two more four-dimensional Lie algebras which admit invariant non-degenerate form of Lorentzian signature: *f = u(1,1)* and *l = oscillator algebra.* They determine two more important spacetimes, F and L. We thus have two more conformally covariant wave operators. Such a list is now complete.

In terms of general relativity, L an *isotropic electromagnetic field determined by a covariantly constant light-like vector* (see [Le-86, p.123]). Energy conditions hold. This spacetime is a special case of *plane waves.*

Treated as the solution of Einstein equations, F is interpreted as a *tachionic fluid,* [Kr-80, p.57]. In the expression for the corresponding bi-invariant metric, there is a parameter *a* related to a choice of an invariant form on the simple *su(1,1)*-sub-algebra of *u(1,1)*. The scalar curvature is $-6/a^2$. *Energy density* and *pressure* are both negative; $-1/(a^2)$. These statements have been proven in [Le-07]. The parameter *a* is a conformal invariant. Energy density and pressure both negative imply *energy conditions violation*, that is why the world *F* plays a special role in what can be called a DLF-model.

In brief, these findings seem to set up quite a new perspective to develop the "Particles and Interactions" theory. Specifically, one might argue that "conventional" properties of an object are due to the D-component, while the L- and F-properties (of each object) can play the role of (long wanted) *hidden variables* of quantum mechanics.

Regarding cosmology, a corresponding model for a universe incorporates not just conventional D-properties (which are characteristic for a static Einstein universe) but L-properties (of a *plasma cosmology,* [Da-05, p.303]), and F-properties (with creation of matter mechanism, [Da-05, p.308]).

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