TOPOLOGICAL GEOMETRODYNAMICS
p-Adicization program and number-theoretic universality

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Basic ideas

- **Generalization of number concept** by gluing of reals and **p-adics** along common rationals (algebraics for algebraic extensions of p-adics). Generalization of the notion of imbedding space by gluing real and p-adic imbedding spaces together along common rationals (algebraics).

- **p-Adic physics as physics of cognition of intention.** p-Adic space-time sheets correlates for intention and cognition. p-Adic-to-real transition corresponds to transformation of intention to action.

- Real space-time sheets possess effective p-adic topology: large number of common points with p-adic space-time sheet transforming in quantum jump to a real space-time sheet as intention becomes action! Only **zero energy ontology** (all states have vanishing conserved quantum numbers) makes possible these transitions!

- **Effective p-adic topology** justifies the use of p-adic thermodynamics in p-adic mass calculations.

p-Adicization program

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- **Physics should be number theoretically universal!**
- **Generalization of the number concept by fusing reals and p-adics along commong rationals/algebraics.**
- **Imbedding space and space-time sheets should have p-adic counterparts for any extension of p-adic numbers. p-Adic space-time sheets by algebraic continuation of algebraic formulas expressing these space-time sheets as 4-surface in real context. Rational functions with coefficients which are algebraic numbers in extension allows to achieve this.**
- **Solutions of modified Dirac equation should have p-adic counterparts. Algebraic continuation again.**
- **S-matrix elements should make sense in any number field. Achieved if S-matrix elements algebraic numbers. Discretization of the stringy formulas for S-matrix elements. 1-D integral replaced with a finite sum. Discrete set of points identifiable as the intersection of p-adic and real space-time sheets. Interpretation as number theoretic braid.**

p-Adic counterpart for the world of classical worlds?

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- Also configuration space and configuration space spinor fields should have p-adic counterparts. For Fock states (CH spinors) algebraization not a problem.

- Suppose S-matrix elements are expressible using data associated with maxima of Kähler function K only (loop corrections should vanish by quantum criticality). This space consists of maxima of K only. Duistermaat-Heckman theorem.

- The resulting space would be analogous to minima of free energy for spin glass energy landscape. Vacuum degeneracy of Kähler action indeed gives rise to spin glass degeneracy with canonical transformations of CP_2 acting as U(1) gauge transformations which are dynamical but not gauge symmetries.

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- Set of free-energy minima in spin glass energy landscape allows ultrametric topology. Distance between two points corresponds the shortest path. Distance along given path the height of highest mountain at the path. Maximization for absolute minima of Kähler action analogous to the definition of ultrametric topology.

- If vacuum functional is algebraic number for maxima, the situation simplifies dramatically and good hopes for p-adicization to work.

- If number of eigenvalues in given extension of rationals contributing to the Dirac determinant defining vacuum functional is finite, an algebraic number results (also simple transcendentals like e could be allowed, e^p exists p-adically).

- Hierarchy of algebraic extensions does not define hierarchy of approximations but hierarchy of physics and hierarchy of cognition.

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Vacuum functional as Dirac determinant

- Conjecture: Riemann ζ number theoretically universal: zeros s_k of ζ algebraic numbers. ζ and its building blocks $1/(1-p^{-s})$ algebraic numbers for

$$s= \Sigma_k n_k s_k , n_k \geq 0.$$

- Dirac determinant D defines vacuum functional conjectured be equal to the exponent of extremum of Kähler action (roughly). How to define D?

- Generalized eigenvalue equation for modified Dirac operator. Generalized eigen values as functions

$$\lambda(z) = \log(p)\, \zeta^{-1}(z),$$

z projection of X^2 point to geodesic sphere of CP_2. (continuous collections of eigenvalues). $\lambda(z)$ as branches of $\zeta^{-1}(z)$, labelled by zer

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- **Definition of Dirac determinant as**

  $D=\prod D_i$,

  D_i are Dirac determinants associated with   algebraic points of X^2 satisfying

  $z_i= \zeta\ (\Sigma_k\ n_k\ s_k)$.

  Number theoretic braid. Only the eigenvalues s belonging to algebraic extension used contribute. If their number is finite, D is finite algebraic number as required.

- **log(p)-dependence of S-matrix elements: p-adic coupling constant evolution from modified Dirac equation.**

- **Scaling of eigenvalues by log(p) has no effect vacuum functional. Kähler coupling strength has no dependence on p-adic leng[illegible]n accordance with postulated quantum criticality and interpretation as analog of critical temperature.**

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