Quantum theory as square root of thermodynamics

1. Vacuum functional:

   (a) Real/imaginary exponent of Khler function/Morse function identified as Khler action in Euclidian/Minkows kian regions. Morse function corresponds to ordinary imaginary action exponent ial of QFTs.

   (b) Khler function contains also boundary terms. The terms forcing the eigenvalues of KhlerDirac Cartan algebra charges equal to those for Khler action (Equivalence Principle/Quantum Classical Correspondence).

   (c) The $p^k\gamma_k$ and Chern Simons terms at the ends of the spacetime sheet give massless propagators at partonic 2surfaces and Dirac equation containing Chern Simons term. Interpretation as the analog of Higgs term?

2. Quantum theory as a square root of thermo dynamics: Motivations.

   (a) Zero Energy Ontology. Timelike entanglement coefficients between po sitive and negative energy parts of zero energy state define Mmatrix as a her mitian square root of den sity matrix multiplied by a unitary Smatrix commuting with it. Smatrix universal and corresponds to the standard Smatrix.

   (b) Vacuum functional can be interpreted as square root of product of two exponents. Exponent of Khler function corresponds to square root of exponent of free energy. The exponent of Morse function correspond quantum mechanical action exponential and defines complex phase.

   (c) Questions:

      i. Do WCW spinor fields defi ne square roots of genuine thermodynamical distribu tions?

      ii. Do temperature and other thermodynamical parame ters have direct quantal and space-time correlates?

3. Various Matrices:

   (a) Unitary Umatrix between zero energy states is the fun damental one. Its rows corres spond to Mmatrices and are orhotogonal to each other in the inner product defined by the trace of product. Smatrix disappears in the product so that the basis of orthogonal square roots of density matrix is obtained.

   (b) Mmatrices are parametrized as rows of Umatrix by zero energy states and can be regarded as matrices between positive and negative energy parts of zero energy states.

   (c) Only the square root of density matrix depends on the parametrizing zero energy state and Smatrix is universal.