Hyperfinite factors and TGD

1. There are three types of von Neuman algebras: factors of type I,II,III. Factors of type I appear in wave mechanics and lead to standard quantum measurement theory. Hyper-finite factors of type III apppear in quantum field theory (von Neumann himself regarded these factors pathological)

2. Fermionic Fock space represents canonical example about hyper-finite factor of type II_1 (HFF). WCW spinors correspond to fermionic Fock space which raises two questions:

   (a) Do WCW spinors correspond to HFF?

   (b) Do WCW "orbital" degrees of freedom correspond to HFF by super-conformal symmetry?

3. The basic of properties of HFFs:

   (a) the trace of unit matrix equals to one rather than to infinite dimension of Hilbert space so that a projector with non-vanishing trace always projects to infinite-D subspace.

   (b) it is not possible to select a onedimensional sub-space since the trace for the projector would vanish so that state function reduction is always to infinite sub-space with final state density matrix given by the projector meaning that it is not possible to measure with complete precision: always infinite number of degrees of freedom remain unmeasured. This raises the question how this degeneracy relates to the degeneracy unit density matrix assignable to negentropic entanglement associated with large h_{eff} hierarchy?

   (c) HFF can be approximated with finite-D sub-algebra in arbitrary accuracy.

4. Inclusions of HFFs allow to formulate the notion of finite measurement resolution in zero energy ontology

   (a) HFF is self-similar fractal in the sense that there is infinite hierarchy of inclusions of HFF to itself, which are characrterized by fractal dimensions (index of inclusion) characterizig the dimension of state space modulo finite measurement resolution giving aconnection with quantum groups.

   (b) the included subfactor creates states which cannot be distinguished in the resolution used