

1077-81-2281

William H Sulis* (sulisw@mcmaster.ca), 255 Townline Rd E, RR5, Cayuga, Ontario N0A 1E0, Canada. *The Reality Game: A Process Theory Approach to Quantum Foundations.*

Causal tapestries, an innovative complex systems-process theory approach to quantum foundations, address several foundational problems including the measurement problem, nonlocality, and entanglement. Causal tapestries admit a Lorentz invariant dynamic corresponding to a succession of transient “nows” as required by process theory. A causal tapestry I is a 4-tuple (L, K, \mathcal{M}, I_p) where K is an index set of cardinality κ , \mathcal{M} a causal space, I_p a causal tapestry and L a set of informons such that each informon in L has the form $[n] < \alpha > \{G\}$ with $n \in K$, $\alpha \in \mathcal{M}$ and G an acyclic directed graph whose vertex set is a subset of L_p , b) The union of all such G forms an acyclic directed graph, c) The mapping $i : [n] < \alpha > \{G\} \rightarrow \alpha$ is a causal embedding. There are ancillary conditions to preserve causal consistency across informons. The reality game is a two player multilayer combinatorial game involving two coupled tapestries, E (event) and P (process), evolving new tapestries through techniques of forcing and E-F games. A graph duality between the spaces of symmetry operators on E and P is shown conditionally to reduce to the classical state-momentum space duality of quantum mechanics. (Received September 22, 2011)