Abstract Submitted
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Scalar Fields via Causal Tapestries WILLIAM SULIS, McMaster University/University of Waterloo — Causal tapestries provide a framework for implementing an explicit Process Theory approach to quantum foundations which models information flow within a physical system. We consider event-transition tapestry pairs. An event tapestry O is a 4-tuple (L, K, M, $\underline{\mathrm{I}}_p$) where K is an index set of cardinality κ, M = M x F(M) x D x P(M') a mathematical structure with M a causal space, F(M) a function space, D a descriptor space, P(M') either a Lie algebra or tangent space on a manifold M', $\underline{\mathrm{I}}_p$ an event tapestry. L consists of elements of the form $[n]<\alpha>\{G\}$, n in K, α in M and G an acyclic directed graph whose vertex set is a subset of L_p Likewise, a transition tapestry Π is a 4-tuple (L', K', M', $\underline{\mathrm{I}}'_p$) where M' = M' x F(M') x D' x P'(M). The dynamic generates a consistent succession of O $-$ Π pairs by means of a game based on the technique of forcing used in logic to generate models. This dynamic has previously been shown to be compatible with Lorentz invariance. An application of this approach to model scalar fields is presented in which each informon is associated with a function of the form f($\pi \mathrm{k}_1/\sigma_1,\ldots,\pi \mathrm{k}_N/\sigma_N$)sin ($\sigma_1 \mathrm{t}_1 - \pi \mathrm{k}_1$)/ ($\sigma_1 \mathrm{t}_1 - \pi \mathrm{k}_1$) ....sin ($\sigma_N \mathrm{t}_N - \pi \mathrm{k}_N$)/ ($\sigma_N \mathrm{t}_N - \pi \mathrm{k}_N$) and the WSK interpolation theorem is used to generate the resulting scalar field on the causal manifold.

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