

1 A New Look at the Mathematics of Quantum Information

see Zhengwei Liu, Alex Wozniakowski, $PA + PF \Rightarrow PAPP \Rightarrow QI \Rightarrow M \cup \Phi$

We know that a language of algebra can be defined for $\dim = 1$, planar algebra for $\dim = 2$ and quon for $\dim = 3$. On the other hand, there is a connection between 1-string theory and category theory, 2-string theory and planar algebra and 4-string theory and quon.

To study quantum information, we can use a diagrammatic language. Thus, we can prove theorems with pictures! In this way, a “charge” can be denoted as \cap_k for $k \in \mathbb{Z}_d$ and its adjoint, a *vertical reflection*, as $\cap_k^* = \cup_{-k}$.

Key concepts: twisted product, reflection positivity condition, string Fourier transform (a generalisation of the Fourier transform), Pauli matrices, Reidemeister moves