SwissMAP

The Mathematics of Physics
National Centre of Competence in Research

Contribution ID: **18**   Type: **not specified**

Lattice models arising from non-semisimple TQFT

Friday 1 July 2022 11:00 (1 hour)

There is a rich interplay between two-dimensional topological phases in quantum mechanical systems and topological quantum field theory. This interaction is further enriched as topological structures inherent in TQFT lead to novel features, such as non-abelian braiding statistics for low energy excitations, when expressed in the corresponding quantum mechanical models. In this talk, we will review the relationship between Turaev-Viro TQFTs and Levin-Wen string net models for topological matter. We will explain new joint work with Geer, Patureau-Mirand, and Sussan extending this relationship to modified Turaev-Viro theories coming from non-semisimple TQFT. These new non-semisimple Levin-Wen models exhibit a novel feature of being pseudo-Hermitian, so that they have real spectrum, evolve via the Schrodinger equation, and have normalizable wavefunction, but are not given by Hermitian Hamiltonians.

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