Julius-Maximilians-
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MUΦX
Lehrstuhl X

Announcement

Seminar on Deformation Quantization

21. 4. 2023 at 2pm CEST

Seminarroom SE 30

Mahdie Hamdan (Uni Cardiff)

Non-frustration free ground states of non-abelian quantum double models

Quantum spin models are widely studied for their potential use in quantum computing, where they can serve as building blocks for quantum algorithms. Kitaev's quantum double model is of particular interest, as its properties could allow for fault-tolerance quantum computation. In two-dimensional quantum spin systems on the infinite lattice $\mathbb{Z}^2$, this model is known to exhibit a unique frustration-free ground state, although other ground states may exist, and it is theorized that these ground states always correspond to objects in a modular tensor category, deeply connected to the representation theory of the quantum double of an underlying group G. Using an operator algebraic approach, I will introduce Kitaevs quantum double model for a finite non-abelian group G on a lattice $\mathbb{Z}^2$ and explore its ground states. I conjecture that these non-frustration free ground states, called anyons, correlate to non-trivial irreducible representations of the quantum double $D(G)$ and that they form a complete set of ground states. This is a joint work with Pieter Naaijkens.

Invited by Stefan Waldmann