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Dagger Categories and Higher Spin Statistics

Dagger categories, which generalize the category of Hilbert spaces equipped with the dagger operation, may be used in functorial field theory to model the physical property of unitarity: one requires unitary functorial field theories to be functors of dagger categories. In the case of invertible, fully-extended functorial field theories, we construct an action of the orthogonal group extending the reflection and spin flip actions on manifolds as well as the complex conjugation and fermion parity operations on super Hilbert spaces. We show that for this subclass of theories, unitarity imposes an equivariance condition for the O-action, which we interpret as a higher version of the spin-statistics theorem in quantum field theory.

This talk is based on joint work with L. Müller and L. Stehouwer.

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