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Fully epistemic toy theory¹ MICHAEL SKOTINIOTIS, AIDAN ROY, BARRY C. SANDERS, Institute for Quantum Information Science, University of Calgary — The Spekkens toy model is an interesting example of how to modify classical physics in order to perform several quantum information processing tasks. Spekkens' toy model has four axioms concerning toy states, valid operations, measurements, and composition of single toy systems. Motivated by the empirical indistinguishability of epistemic vs. ontic states in the toy universe, we show that relaxing valid operations to mappings of epistemic rather than ontic states preserves the features of the toy model. Similarly we show that relaxing the axiom regarding the composition of single toy systems also preserves the toy model. Relaxing both axioms simultaneously, however, breaks the correspondence of the toy model with quantum theory because the tensor product composition rule is violated, but these two relaxations together produce a group of operations on epistemic states that is isomorphic to the projected extended Clifford Group.

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Prefer Oral Session

Prefer Poster Session

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