Fully epistemic toy theory[1] MICHAEL SKOTINIOTIS, AIDAN ROY,
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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, mea-
surements, and composition of single toy systems. Motivated by the empirical in-
distinguishability 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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