Title: Toys can't play: physical agents in Spekkens' theory

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Abstract: Information is physical, and for a physical theory to be universal, it should model observers as physical systems, with concrete memories where they store the information acquired through experiments and reasoning. Here we address these issues in Spekkens' toy theory, a non-contextual epistemically restricted model that partially mimics the behaviour of quantum mechanics. We propose a way to model physical implementations of agents, memories, measurements, conditional actions and information processing. We find that the actions of toy agents are severely limited: although there are non-orthogonal states in the theory, there is no way for physical agents to consciously prepare them. Their memories are also constrained: agents cannot forget in which of two arbitrary states a system is. Finally, we formalize the process of making inferences about other agents' experiments and model multi-agent experiments like Wigner's friend. Unlike quantum theory or box world, in the toy theory there are no inconsistencies when physical agents reason about each other's knowledge.

Zoom Link: TBD





























