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Daniel Michael Cicala* (cicala@math.ucr.edu). *A bicategorical syntax for pure state qubit quantum mechanics.*

We begin by constructing a framework used to study open networks modeled by graphs and their rewritings. This consists of a symmetric monoidal compact closed bicategory built by combining spans and cospans inside a topos. Into this bicategorical framework, we fit Coecke and Duncan's zx-calculus, a graphical language used to reason about pure state qubit quantum mechanics. After viewing the zx-calculus through this lens, we highlight several benefits over the 1-categorical approach: the presence of a symmetric monoidal compact closed structure and a better representation of rewriting information. (Received June 22, 2017)