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New results in the category-theoretic approach to foundations of quantum physics BOB COECKE, Oxford University — We report on some recent results in the category theoretic approach quantum physics, which aims to provide an operational foundation, a logical axiomatics as well as a purely diagrammatic language for it. Firstly, we were able to unify several measurement-based quantum computational schemes; in particular, the categorical language is sufficient to provide proofs of universality for each of these. Secondly, we have a manner to abstractly generate arbitrary multi-partite entangled states; hence equipping multi-partite entanglement with a formal interpretation in terms of information-flow. Also, we axiomatised Spekkens' model in purely category-theoretic terms; its quantum-like behaviors are now consequences merely of abstract category-theoretic structure.

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