Abstract Submitted
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Graphical Calculi and Mutually Unbiassed Embeddings of Classical Logic[1] ROSS DUNCAN, Oxford University — While arbitrary quantum states may not be freely cloned or deleted [1], we note, following [2], that these distinctively classical operations may be performed on states which lie within a given basis. Each basis therefore provides an embedding of classical logic into a quantum state space. This work provides a categorical axiomatisation (cf [3]) of the interaction of such embeddings when distinct mutually unbiassed bases [4] are used. We provide a graphical language (cf. [5]) for the classical operations that each embedding provides, and demonstrate that this system captures many properties of multi-partite entangled states and can simulate quantum algorithms. [1] W. Wootters and W. Zurek. A single quantum cannot be cloned, 1982. A.K. Pati and S. L. Braunstein. Impossibility of deleting an unknown quantum state, 2000. [2] B. Coecke and D. Pavlovic (2007) Quantum measurements without sums. arXiv:quant-ph/0608035. [3] S. Abramsky and B. Coecke (2004) A categorical semantics of quantum protocols. arXiv:quant-ph/0402130. [4] J. Schwinger (1960) Unitary operator bases. Proceedings of the National Academy of Sciences of the U.S.A. 46 [5] B. Coecke (2005) Kindergarten quantum mechanics. arXiv:quant-ph/0510032

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Ross Duncan
Oxford University

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