
CARLO MARIA SCANDOLO, University of Calgary

Necessary and Sufficient Conditions on Measurements of Quantum Channels

Quantum supermaps are a higher-order generalization of quantum maps, taking quantum maps to quantum maps. It is known that any completely positive, trace non-increasing (CPTNI) map can be performed as part of a quantum measurement. By providing an explicit counterexample we show that, instead, not every quantum supermap sending a quantum channel to a CPTNI map can be realized in a measurement on quantum channels. We find that the supermaps that can be implemented in this way are exactly those transforming quantum channels into CPTNI maps even when tensored with the identity supermap.