RUPERT LEVENE, University College Dublin

Schur multipliers and mixed unitary maps

We consider the tensor product of the completely depolarising channel on $d \times d$ matrices with the map of Schur multiplication by a $k \times k$ correlation matrix and characterise, via matrix theory methods, when such a map is a mixed (random) unitary channel. When $d = 1$, this recovers a result of O'Meara and Pereira, and for larger d is equivalent to a result of Haagerup and Musat that was originally obtained via the theory of factorisation through von Neumann algebras. We obtain a bound on the distance between a given correlation matrix for which this tensor product is nearly mixed unitary and a correlation matrix for which such a map is exactly mixed unitary. This bound allows us to give an elementary proof of another result of Haagerup and Musat about the closure of such correlation matrices without appealing to the theory of von Neumann algebras.

This is joint work with Sam Harris, Vern Paulsen, Sarah Plosker and Mizanur Rahaman.