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Separating the matrix-valued bipartite correlation sets

In recent years, there has been much study devoted to various sets of quantum bipartite correlations in a finite-input, finite-output system. These sets are often denoted by $C_t(m,k)$, where m is the number of inputs, k is the number of outputs, and t represents the model that is being used. Some of the most notable models are the finite-dimensional (tensor product) model $(t=q)$ and the tensor product model $(t=qs)$. Thanks to recent work of W. Slofstra, it is known that $C_{qs}(m,k)$ is not a closed set if m and k are large enough. Recent work of A. Coladangelo and J. Stark shows that $C_q(5,3) \neq C_{qs}(5,3)$. In this talk, we consider a matrix-valued generalization of these sets, denoted $C_t^{(n)}(m,k)$, where Alice and Bob have access to n (orthonormal) states instead of just 1. We show that there is some $n \leq 13$ such that, whenever $m,k \geq 2$ and $(m,k) \neq (2,2)$, we have that $C_q^{(n)}(m,k) \neq C_{qs}^{(n)}(m,k)$ and that $C_{qs}^{(n)}(m,k)$ is not a closed set. This is based on joint work with Li Gao and Marius Junge.