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Certification of incompatible measurements and entangled subspaces using quantum steering

In recent times, nonlocality has been extensively explored for various device-independent certification tasks. Despite the success of these certification schemes towards verifying huge class of states, the avenue for certification of measurements is not well explored. It remains a highly nontrivial problem to propose a device independent scheme which could certify arbitrary pairs of incompatible measurements. Here we address this problem and propose a one-sided device independent protocol which could certify arbitrary d -outcome incompatible measurements along with entangled subspaces of local dimension d . We characterize the class of measurements which be used to certify the maximally entangled state of local dimension d . We find the robustness of our self-testing statement for a large class of incompatible measurements using a new analytical technique which might be helpful to find robustness bounds for various other self-testing statements. We further find a new steering inequality which can be used to self-test d dimensional schmidt states.

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