UNITARY-INVARIANT METHOD FOR WITNESSING NONSTABILIZERNESS IN QUANTUM PROCESSORS

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Nonstabilizerness, also known as 'magic', is a crucial resource for quantum computation. The growth in complexity of quantum processing units (QPUs) demands robust and scalable techniques for characterizing this resource. We introduce the basis-independent notion of set magic: a set of states has this property if at least one state in the set is a magic state. We show that certain two-state overlap inequalities, recently introduced as witnesses of basis-independent coherence, are also witnesses of set magic. Finally, we show that using such witnesses, one can robustly certify nonstabilizerness in a network of QPUs without having to entangle the different devices and with reduced demands compared to the individual certification of each QPU.