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Entropic bounds for unitary testers and mutually unbiased unitary bases
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Abstract
We define the entropic bounds, i.e. minimal uncertainty for pairs of unitary testers in distinguishing between unitary transformations not unlike the well known entropic bounds for observables. We show that in the case of specific sets of testers which pairwise saturate the trivial zero bound, the testers are all equivalent in the sense their statistics are the same. On the other hand, when maximal bounds are saturated by such sets of testers, the unitary operators would form unitary bases which are mutually unbiased. This resembles very much the role of mutually unbiased bases in maximising the entropic bounds for observables. We show how such a bound can be useful in certain quantum cryptographic protocols. © 2019 Elsevier Inc.

Author Keywords
Entropic bound; MUUB; PPOVM; Tester

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