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Quantum Physics

Extreme commutative quantum observables are sharp

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It is well known that, in the description of quantum observables, positive operator valued measures (POVMs) generalize projection valued measures (PVMs) and they also turn out be more optimal in many tasks. We show that a commutative POVM is an extreme point in the convex set of all POVMs if and only if it is a PVM. This results implies that non-commutativity is a necessary ingredient to overcome the limitations of PVMs.

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