

Referee report

This paper proposes and studies a variant of quantum hypothesis testing, where any test can have a third, inconclusive outcome and the error probabilities are conditioned on obtaining a conclusive outcome. The hypothesis testing problem in this setting is fully described both in one shot and asymptotic regime and is related to the Hilbert projective metric in the asymmetric setting and the Thompson metric in the symmetric setting. In contrast with the usual quantum hypothesis testing, explicit formulas are obtained rather easily and the problem is simplified considerably. The results are extended to discrimination of quantum channels, where it is shown that parallel strategies are optimal even if the most general discrimination strategies are allowed. The proofs rely on basic properties of convex cones and linear maps and can be, in the case of states, extended to a wide class of general probabilistic theories.

Although the relevance of these results to the usual problem of quantum hypothesis testing is yet unclear, the observed simplification in the postselected setting is quite intriguing and clearly deserves publication and further investigation.

The paper is very carefully written and easily readable. My only suggestion to the authors is to consider to include the proof of Eq. (91) (in the proof of Thm. 11), where a reference to [64, Theorem 13] is given. The proof does not seem very complicated and further illustrates that the results are indeed obtained just from the linearity and positivity assumptions.