C. Duarte, L. Catani, R.C. Drummond, Relating compatibility and divisibility of quantum channels (revised version)

Referee report

In the revision, the authors made some changes, the text was substantially rewritten and reorganized, but my most important problem with this paper remains: All the results are just very simple consequences of the results obtained in Ref. [13]. Besides,

1. The authors do cite [13] and Theorem III.1 (or A.5) is correctly attributed to this paper. But the present paper depends on this result so heavily that, in my opinion, it would be appropriate to emphasize this dependence in the Introduction, which is not done.

2. The authors seem to suggest that up to their present paper, the importance of (anti)degradable channels was recognized only in the context of quantum capacities. This is simply not true: in [13, Sec. 4.3], it is explicitly written that the antidegradable channels are exactly the self-compatible channels. This is a feature with a much clearer physical interpretation than the properties proven in the present paper (which are in fact just its consequences).

3. The authors promise to provide a physical intuition, all I can see is a lengthy and repetitive explanation of basic things that are easily understandable even to non experts, with not so much effort.

4. One detail that I found strange is the Remark on p. 3, expanded in Appendix A, suggesting that Theorem III.1 (or A.5) depends on the particular choice of the complementary channel, so it might not hold if we choose another Stinespring representation (and corresponding complementary channel). But it is known (as explicitly mentioned in [13] before Proposition 4 bearing the statement of Thm III.1) that any two complementary channels are concatenation equivalent (so each divides the other, in the language of the present paper). Hence there is no ambiguity.

In conclusion, the authors put some effort in the revision, but did not succeed to fill the paper with content that would justify publication. So my opinion remains unchanged, I cannot recommend this paper for publication.