A new definition of the entangled mutual entropy, based on an alternative definition of relative entropy, is introduced. This definition provides a larger entropy bound for quantum capacity. It is proved that, in a sense, this bound is more additive than the Holevo bound so that, under certain conditions, there is no need to consider this mutual information for the powers of quantum channel in order to guarantee that this entropy bound provides the real upper bound for long quantum block encodings.

Reviewed by Adán Cabello

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