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Achieving the Holevo Bound Via Sequential Measurements

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Abstract:

We present a new decoding procedure to transmit classical information in a quantum channel which, saturating asymptotically the Holevo bound, achieves the optimal rate of the communication line. Differently from previous proposals, it is based on performing a sequence of (projective) YES/NO measurements which in N steps determines which codeword was sent by the sender (N being the number of the codewords). Our analysis shows that as long as N is below the limit imposed by the Holevo bound the error probability can be sent to zero asymptotically in the length of the codewords.