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TITLE: Dense covariant coding/ Estimation of $SU(2)$ operations

ABSTRACT:

We present a dense coding inspired procedure, which enables a highly efficient transmission of information of a continuous nature. The procedure requires the sender and the recipient to share a maximally entangled state. We deal with the concrete problem of estimating unitary transformations on qubits (which is formally equivalent to aligning reference frames by means of a quantum system). We find the optimal covariant measurement and compute the corresponding average fidelity, which has a remarkably simple closed form. We show that the optimal fidelity approaches unity quadratically in the inverse of the number of qubits.