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【526】 Coherence Equality and Communication in a Quantum Superposition

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I will introduce a “coherence equality” that, in the spirit of Bell’s inequalities, can be used to discriminate between classical and quantum resources. This equality is satisfied by any classical communication (localized carrier), but is violated when the carrier is in a quantum superposition of communication directions. This implies that the classical success probability of a certain communication task is always equal to $1/2$. Yet, we develop two simple quantum schemes that systematically deviate violate the coherence equality. Such a violation can also be exploited as an operational way to witness spatial quantum superpositions without requiring the use of an interferometer, but only by means of spatially separated local measurements.

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