

Abstract Submitted
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A measure of Quantum Unspeakable Information¹ DAVIDE GIROLAMI, National University of Singapore — A piece of information is said unspeakable if it cannot be encoded into a sequence of bits. For example, the transformation law between the coordinates of two distant laboratories cannot be specified without a shared reference frame. This condition has been proven to be equivalent to constrain local operations in the two labs by means of a superselection rule [Rev. Mod. Phys. 79, 555 (2007)]. I introduce a measure of unspeakable information based on the skew information [PNAS 49, 910 (1963)], which evaluates the ability of a quantum state to act as a reference frame under a specific superselection rule. Then, I show that evaluating unspeakable information is equivalent to measuring the amount of quantum coherence of a state with respect to a given basis. I propose a proof of concept experiment in optical set-up to evaluate the amount of unspeakable information, i.e. of relative coherence, of a quantum state without fully reconstructing its density matrix.

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