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Generalized Limits for Single-Parameter Quantum Estimation[1]
SERGIO BOIXO, STEVEN FLAMMIA, J.M. GEREMIA, CARLTON CAVES, University of New Mexico — We develop generalized bounds for quantum single-parameter estimation problems for which the coupling to the parameter is described by intrinsic multi-system interactions. For a Hamiltonian with k-system parameter-sensitive terms, the quantum limit scales as $1/N^k$ where N is the number of systems. These quantum limits remain valid when the Hamiltonian is augmented by any parameter-independent interaction among the systems and when adaptive measurements via parameter-independent coupling to ancillas are allowed.

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