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On the properties of the asymptotic incompatibility measure in multi-parameter quantum estimation

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In multiparameter quantum metrology, asymptotic incompatibility (AI) is a recently introduced measure quantifying the quantumness of statistical models. Starting from its definition, we found that it is possible to set an upper bound on the maximum number of asymptotic compatible parameters in the statistical model. We numerically investigate the AI for the full tomography of d -dimensional quantum systems ($2 < d \leq 4$). Using exponential coordinates, numerical results suggest that, once we fix the spectrum of the corresponding Hamiltonian, the AI measure is a function of the fictitious temperature β only. In addition, the maximum number of asymptotic compatible parameters is a function of the dimension d . We conjecture that these results are valid for any finite dimension d .

Primary author(s) : CANDELOORO, Alessandro (University of Milan)

Co-author(s) : GENONI, Marco; Prof. PARIS, Matteo (University of Milan)

Presenter(s) : CANDELOORO, Alessandro (University of Milan)

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