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Seminar über Ultrafast Science and Technology

Referent: Bruno Eckmann, Institute of Applied Physics, University of Bern

Titel: Bachelor Talk: Quantum State Tomography with Regularized Finite Statistics

In Quantum State Tomography, the state of some quantum mechanical system is reconstructed by means of projective measurement results. For this, several reconstruction schemes exist, such as linear inversion and Maximum Likelihood estimation. While in linear inversion density matrix reconstructions are typically non-physical due to the consideration of finite statistics, schemes like Maximum Likelihood estimation are investigated. Unfortunately, the latter leads to intrinsically biased estimations. Therefore, in the context of entangled bipartite quantum states, an alternative approach has been studied. Through the regularization of measurement results, the statistical fluctuations are reduced to a valid subset of the probability space.

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