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**Title: Characterization of quantum states and processes with machine learning**

**Abstract:**

In this contribution, we discuss potential applications of machine learning methods for characterizing various many-body regimes. We consider how classical neural networks can be used for classification of various regimes in single-particle and many-body quantum systems. We present the results of the classification between regular and chaotic behaviour in quantum billiard models with remarkably high accuracy using neural network algorithms. We also discuss the implementation of quantum tomography protocols with the use of machine learning methods. Specifically, we demonstrate that the method based on employing Restricted Boltzmann Machines potentially allows achieving full assessment of quantum states based on a smaller amount of experimental data. We discuss an application of neural-network quantum state characterization in experimental balanced homodyne tomography.