

Monday
May 12, 2025, 12:00 PM
Building E2 6, Room E.11,
Everyone is welcome!

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Quantum System Characterization

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Quantum computers are highly sensitive to errors, so it is important to ensure they function correctly. Typically, we wish a quantum computer to correctly implement a target model consisting of state preparation, gate set, and measurement. Figuring out to what extent this task is achieved and reporting the answer in a hardware-independent way is the central task in the field of quantum system characterization.

This talk will start with a general motivation for the field and provide paradigmatic example protocols, including gate-set tomography and randomized benchmarking. As an example of recent progress, a practical method for certifying that a single-qubit gate set is sufficiently close to the target one will be presented. Under the assumption that the Hilbert space dimension is known, we rigorously guarantee that only the target gate set is accepted. Hence, it solves a task reminiscent of self-testing and is the first sound certification protocol for quantum gate implementations.

