Contribution ID: **9**

Type: **Talk**

Quantum Sequential Hypothesis Testing

Tuesday, 31 August 2021 11:00 (30 minutes)

We introduce sequential analysis in quantum information processing, by focusing on the fundamental task of quantum hypothesis testing. In particular, our goal is to discriminate between two arbitrary quantum states with a prescribed error threshold ε when copies of the states can be required on demand. We obtain ultimate lower bounds on the average number of copies needed to accomplish the task. We give a block-sampling strategy that allows us to achieve the lower bound for some classes of states. The bound is optimal in both the symmetric as well as the asymmetric setting in the sense that it requires the least mean number of copies out of all other procedures, including the ones that fix the number of copies ahead of time. For qubit states we derive explicit expressions for the minimum average number of copies and show that a sequential strategy based on fixed local measurements outperforms the best collective measurement on a predetermined number of copies. Whereas for general states the number of copies increases as log 1/ε, for pure states sequential strategies require a finite average number of samples even in the case of perfect discrimination, i.e.,
ε=0.

Is this abstract from experiment?

No

Name of experiment and experimental site

N/A

Is the speaker for that presentation defined?

Yes

Details

Dr. Michalis Skotiniotis, Universitat Autonoma de Barcelona, Spain,
https://grupsderecerca.uab.cat/giq/

Internet talk

No

Primary author: SKOTINIOTIS, Michalis (Universitat Autonoma de Barcelona)

Co-authors: Dr HIRCHE, Christoph (University of Copenhagen); Mr MARTÍNEZ-VARGAS, Esteban (Universitat Autonoma de Barcelona); Dr SENTÍS, Gael (Universitat Autonoma de Barcelona); Prof. CALSAMIGLIA, John (Universitat Autonoma de Barcelona); Mrs CARRIZO, Marta (Universitat Autonoma de Barcelona); Prof. MUÑOZ-TAPIA, Ramon (Universitat Autonoma de Barcelona)

Presenter: SKOTINIOTIS, Michalis (Universitat Autonoma de Barcelona)

Session Classification: C Quantum Physics, Quantum Optics and Quantum Information