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Satellite Event: Tutorial Lecture "Structure of Quantum Channels"

Monday, 28 September 2020 10:00 (2 hours)

One of the most promising tasks of quantum information is establishment of secure and reliable quantum communication channels over distant nodes. Beside theoretical success in formalizing the role of quantum features of systems for communication, current technological progress supports practical implementation of communication protocols. However, the role of quantum channels in quantum information science and technology is not restricted to communication protocols. The most general form of evolution of quantum systems is described by a quantum channel or a completely positive trace preserving (CPTP) map. Analyzing the mathematical structure of the space of CPTP maps, not only deepens our understanding on the nature of quantum evolution, but also plays an important role in implementation of quantum information tasks. In this tutorial, after a short review on the role of quantum channels in communication, we review the convex structure of quantum channels as well as divisibility properties of quantum channels. We will discuss how such an abstract knowledge leads to practical applications such as quantum simulation.

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Session Classification: Satellite Event