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Control of quantum systems by quantum systems

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Quantum systems can be controlled by other quantum systems in a reversible way, without any information leaking to the outside of the system–controller compound. Such coherent quantum control is deterministic, is less noisy than measurement-based feedback control, and has potential applications in a variety of quantum technologies, including quantum computation, quantum communication and quantum metrology. In this talk I present a coherent feedback protocol, consisting of a sequence of identical interactions with controlling quantum systems, that steers a quantum system from an arbitrary initial state into a target state. I reveal the mechanism behind the control and its relation to continuous monitoring of quantum systems. The information about the targets is encoded in the controlling quantum systems and can be the result of a quantum computation. In this way, we hope to achieve the basis for autonomous control that entirely happens within the quantum realm without the need to transform at any stage quantum information into classical information by means of measurements.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/A

Primary author: KONRAD, Thomas (UKZN)

Presenter: KONRAD, Thomas (UKZN)

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