Contribution ID: **243** Type: **Poster Presentation**

Robust control of quantum systems by quantum systems

We present a quantum control scheme which allows for the control of a quantum system by other quantum systems, also called coherent feedback.[1] An assembly of control quantum controllers are coupled sequentially to the to-be-controlled quantum system, driving the system into a target state. We determine a broad class of coherent feedback control channels by identifying the necessary and sufficient conditions which guarantee convergence to the target state, independent of the initial state of the system. We are especially interested in the possibility of autonomous control, meaning that once the system-controller interaction is set up the system converges to any target state encoded in the controllers without intervention by the experimenter. An explicit example of a unitary interaction between system and controllers which implements such a channel is given and we show that even weak system-controller coupling is sufficient to successfully stabilize the system in a target state as well as protect it against noise. The possibility to implement control dynamics is also explored.

Reference
[1] Thomas Konrad, Amy Rouillard, Michael Kastner, and Hermann Uys "Robust control of quantum systems by quantum systems." In preparation.

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

Yes

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

MSc

Primary authors: KONRAD, Thomas (UKZN); ROUILLARD, Amy (University of KwaZulu-Natal)

Presenter: ROUILLARD, Amy (University of KwaZulu-Natal)

Session Classification: Theoretical and Computational Physics

Track Classification: Track G - Theoretical and Computational Physics