universität innsbruck

Department of
Theoretical Physics

Theory Colloquium

Georg Moser, Institute for Informatics, University of Innsbruck

"Formal Methods for Quantum Programs"

Abstract

In this talk, I will present recent results on the expected cost analysis for a mixed classical-quantum programming language. These results can be roughly describes as the introduction of an extension of classical Hoare calculus to the quantum regime and the provision of formal analysis methods, based on this calculus, for the expected cost analysis and expected value analysis of classical-quantum programs.

For context, I'll briefly motivate the study of quantum programming languages and will recall the essentials of Selinger's QPL, a functional programming language, based on the separation of classical control and quantum data. This language combines high-level classical structures with operations on quantum data, and has a clear (denotational) semantics.

Finally, I'll strive for a presentation of the above mentioned result in a non-technical manner. In particular, I'll present the imperative classical-quantum programming language used and clarify it what sense the induced formal methods may be of use.

This is joint work with Martin Avanzini, Romain P\'echoux, Simon Perdrix and Vladimir Zamdzhiev.

Wednesday | 23.03.2022 | 16:00

SR 1 | ICT building