

The Vienna Doctoral Programme on Complex Quantum Systems
invites you to a

Seminar Talk

by

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“Reconstructing quantum space-time from agents' subjective experiences”

Within a global physical theory, a notion of locality allows us to find and justify information-processing primitives, like non-signalling between distant agents. Here, we propose exploring the opposite direction: to take agents as the basic building blocks through which we test a physical theory, and recover operational notions of locality from signalling conditions.

For example, in quantum theory, the tensor product rule allows us to describe independent systems jointly, and imposes a notion of locality of actions. However, if one is given a global system, there is no prior reason for considering some factorization of the system's state space as 'the only physical one.' Thus, if multiple agents observe the same system, their individual factorizations of the state space do not necessarily coincide, but can be related by an isomorphism. We may then explore how a group of agents could find out the relation between their individual factorizations of a global space, given only the operational experimental data for each agent, together with communication, under different constraints.

This factorization problem is a generalization of the marginal problem and of self-testing, both of which assume a fixed tensor factorization behind the different local descriptions. It can be applied to derive conditions for a common space coordinate set shared by a group of agents, and as such it is a first step towards operational quantum relativistic theories.

**Monday, 8 April 2019,
17:00 get-together with coffee and snacks!**

Main Lecture Hall at TU Wien, Atominstitut, Stadionallee 2, 1020 Vienna

Hosted by: Caslav Brukner