

Philipp Höhn (Austrian Academy of Science & University of Vienna)

Title: "Quantum general covariance and the trinity of relational quantum dynamics"

I will summarize a 'perspective-neutral' approach to quantum reference systems, which admits a quantum notion of general covariance. The approach permits one to switch between the descriptions of physics relative to different choices of quantum reference systems, providing a quantum analog of coordinate changes on a manifold. I will then focus on applying this approach to relational dynamics. Apart from offering a systematic method for switching from the evolution relative to one quantum clock to that relative to another, it also allows one to link three approaches to the problem of time that were previously pursued independently. In particular, the relational dynamics in terms of (a) relational observables in Dirac quantization, (b) deparametrizations in reduced quantization, and (c) the conditional state formulation of Page and Wootters, can, under certain restrictions, be mapped into one another. As such, they can be interpreted as three different faces -- the trinity -- of the same relational quantum dynamics.