

# Theorie-Palaver

Dec. 7, 2023 at 10:30 a.m.  
Lorentz room (Staudingerweg 7, 5th floor)

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## **Dynamical reference systems in quantum gravity models**

Accessing the physical sector in models of quantum gravity is on the one hand a challenge, but on the other hand also an important step to be able to analyse and test such models. One way to complete the quantisation programme in loop quantum gravity is to choose dynamical reference systems so-called matter or geometric clocks for which Dirac observables can be constructed in the framework of the relational formalism. The quantisation step then consists in finding representations for the corresponding algebra of Dirac observables that allow one to quantise the dynamics as well. In this way, one obtains an observer-dependent quantum field theory. We will give a brief overview of the existing models and discuss their similarities and differences. Finally, we will discuss examples for investigating some physical properties of models formulated with a particular choice of clocks in cosmology and open quantum systems in which gravitationally induced decoherence is present.