AGPhil 7: Philosophy of Cosmology VII

Zeit: Mittwoch 16:30–18:30 Raum: HS 10

Hauptvortrag AGPhil 7.1 Mi 16:30 HS 10

Time travelling in emergent spacetime — •Christian Wüthrich — University of Geneva, Switzerland

Most approaches to quantum gravity suggest that relativistic spacetime is not fundamental, but instead emerges from some non-spatiotemporal structure. This talk investigates the implications of this suggestion for the possibility of time travel in the sense of the existence of closed timelike curves in some relativistic spacetimes. In short, will quantum gravity reverse or strengthen general relativity's verdict that time travel is possible?

AGPhil 7.2 Mi 17:15 HS 10

Implications of the Modal Structure of Spacetime Events — •Samuel Fletcher — University of Minnesota, Minneapolis, USA

The points of spacetime are often described as events. Events, in turn, are often described as idealized, arbitrarily small and fast possible processes, or the possible parts of histories of particles. This is because not all point-events in a spacetime model represent actual parts of particle histories. However, this raises questions about the modal status of these point-events, for typically a spacetime model represents a merely possible way for spacetime and a material history of states of affairs to be. What does it mean to be a merely possible but not actual point-event of a merely possible but not actual spacetime? How can such mere possibilities play a role

I explore two explications of this status, one in terms of point particles and another in terms of fields. The former encounters certain difficulties explaining the possibility of point particles traversing certain types of closed timelike curves, while embracing a pure field ontology avoids the issues entirely. Thus, maintaining a pure field ontology clarifies and simplifies the modal structure of spacetime theory.

Hauptvortrag AGPhil 7.3 Mi 17:45 HS 10

Q.E.D., QED — •Chris Smeenk and Adam Koberinski — Western University, Canada

Quantum electrodynamics is often regarded as the most well-tested theory ever, due to incredibly high precisions tests such as the measurement of the anomalous magnetic moment of the electron. This talk proposes a different understanding the evidence in favor of QED. Regarding it as confirmed by a series of predictions does not adequately reflect the strength of the case in favor of QED, nor do they correctly capture the logic of theory testing. High precision tests of QED presuppose that the theory is correct in order to describe the experiments. This raises two concerns. The first regards whether this involves circular reasoning. The main issue has been whether any discrepancies that are uncovered with increasing precision can be accounted for with more detailed physical models. For example, low energy experiments with pure QED systems have, surprisingly, reached a level of precision such that other Standard Model interactions have to be taken into account. Studies of different systems have allowed for consistent independent determinations of the fine structure constant. Second, is this use of QED compatible with acknowledging that it is only an effective field theory? We will argue that the reasoning involved in treating these experiments only depends on QED providing an accurate description within a limited domain.