

Causal fermion systems and the causal action principle
Tübingen, 8. Juli (via Zoom)

The theory of causal fermion systems is an approach to describe fundamental physics. It gives quantum mechanics, general relativity and quantum field theory as limiting cases and is therefore a candidate for a unified physical theory. From the mathematical perspective, causal fermion systems provide a general framework for describing and analyzing non-smooth geometries. The dynamics of causal fermion systems is described by a variational principle called the causal action principle.

The aim of the talk is to give a simple introduction, with an emphasis on the underlying concepts.

A Positive Mass Theorem for Static Causal Fermion Systems

Tübingen, 9. Juli (via Zoom)

After a short introduction to causal variational principles, the mass will be defined abstractly as a limit of surface layer integrals comparing two minimizing measures asymptotically near infinity. I will explain a few properties of this mass and state a positive mass theorem. In order to get a connection to the mass of an asymptotically flat static spacetime, I will outline how to construct a static causal fermion system in such a spacetime, and in which sense the ADM mass corresponds to the mass of the resulting causal fermion system.

I am reporting on joint work with Andreas Platzer.