



Contribution ID: 244

Type: **Talk**

What process matrices tell us about quantum spacetime

Wednesday, 25 June 2025 15:25 (15 minutes)

Considering the problems to extract near-term testable predictions from theories of quantum gravity, a promising alternative is to instead start with phenomenological approaches. One such phenomenon, that might be rather generic, is indefinite causal structure: The dynamic causal structure of general relativity gets combined with quantum indeterminism. The most established framework to describe indefinite causal structure is the process matrix framework. However, because of its root in quantum information theory, it can be quite abstract and detached from spacetime concepts. In my presentation, I will bridge this gap by presenting projects I worked on as a PhD student. These projects extracted operational statements about spacetime. If time permits, I will take a contemporary look at the field of process matrices, and propose possible avenues to continue.

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Session Classification: Wednesday Parallel Session F