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沖縄科学技術大学院大学

THEORETICAL SCIENCES VISITING PROGRAM

TSVP TALK

Causal Reasoning in a Quantum World
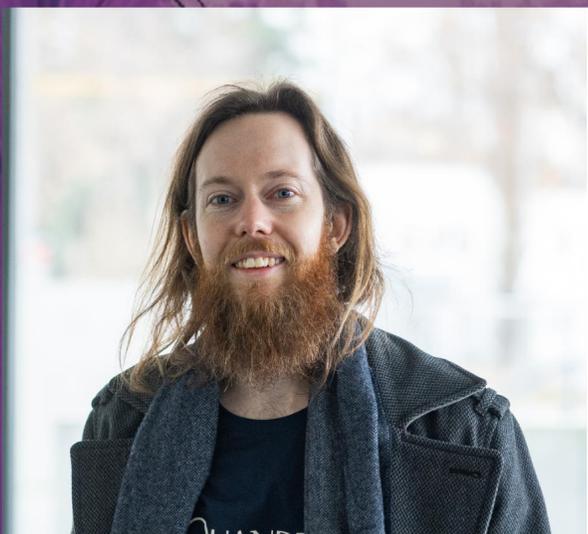
2025 THU. Apr. 03

15:00–16:00

HYBRID L5D23, ZOOM

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Understanding causation is central to progress in both natural and social sciences – merely understanding how variables are correlated does not tell us how we should interact with the world in order to achieve a given aim. In the classical world, there are well developed mathematical frameworks to study causation, which, for example, tell us how to go about extracting causal relationships from data. These frameworks, however, spectacularly break down when it comes to situations involving quantum mechanics. This is exemplified by Bell's theorem, the predictions of which have now been experimentally verified, which shows that there can be no way to salvage our classical understanding of causation in a quantum world. In this talk I will explain all of the above in some more detail, and also talk about some recent work and how it tries to get around these problems and in so doing provide us with tools for causal reasoning in a quantum world.

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John Selby

John Selby is a team leader at the International Centre for Theory of Quantum Technologies at the University of Gdańsk, Poland. He and his team work on a range of topics in the foundations of quantum theory and quantum information, with a particular focus on the use of compositional, diagrammatic approaches in these fields. Previously he was a postdoctoral researcher at Perimeter Institute, Canada, primarily working on formalizing foundational notions of nonclassicality and understanding their role in quantum information processing. He received his PhD from Imperial College London in 2018.

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