

SEMINAR: Correlation Self-Testing of Quantum Theory against Generalised Probabilistic Theories with Restricted Relabelling Symmetry

KUNTAL SENGUPTA

April 28, 2026

12:00 to 13:00

Elements Room

Correlation self-testing of quantum theory involves identifying a task or set of tasks whose optimal performance can be achieved only by theories that can realise the same set of correlations as quantum theory in every causal structure. Following this approach, previous work has ruled out various classes of generalised probabilistic theories whose joint state spaces have a certain regularity in the sense of a (discrete) rotation symmetry of the bipartite state spaces. Here we consider theories whose bipartite state spaces lack this regularity. We form them by taking the convex hull of all the local states and a finite number of non-local states. We show that a criterion of compositional consistency is needed in such theories: for a measurement effect to be valid, there must exist at least one measurement that it is part of. This goes beyond previous consistency criteria and corresponds to a strengthening of the no-restriction hypothesis. We show that quantum theory outperforms these theories in a task called the adaptive CHSH game, which shows that they can be ruled out experimentally. We further show a connection between compositional consistency and Tsirelson's bound.

Hosted by: Prof. Dr. Antonio Acin