Extreme Universe Colloquium

The 8th COLLOQUIUM

July 14th (Thu.) ONLINE

TALK 16:00 - 17:00 (JST)

July 14th (Thu.) 9:00 am - 10:00 am (CEST)

July 14th (Thu.) 3:00 am - 4:00 am (EDT)

ONLINE COFFEE TIME
17:00 - 18:00 (JST)

Registration required (click HERE)

Extreme Universe, JAPAN

Speaker

Prof. Paolo Perinotti

University of Pavia

Title

When does a system affect another? Causal influence vs signalling

Abstract

We address the question whether a reversible transformation allows one of its input systems to have a causal influence on one of its outputs. The question is addressed in a wide framework of theories that includes quantum and classical theories as special cases. We introduce a notion of causal influence and discuss its main features. In quantum theory the causal influence relation coincides with signalling: a system A can affect another system B if we can use the input state of A to convey information to an observer controlling B. We will also discuss classical theory, where the two notions are different. Following the proof of equivalence in the quantum case, we identify general conditions under which causal influence coincides with signalling. We will illustrate, in particular, the property of "no interaction without disturbance". We conclude illustrating an algebraic construction that turns out particularly useful for the purpose of analysing causal influence relations.

2021

MEXT -KAKENHI- Grant-in-Aid for Transformative Research Areas (A)
The Natural Laws of Extreme Universe -A New Paradigm for Spacetime and Matter from Quantum Information-