

Date/Time: 1st November (Tue.) 15:30 ~

Title: Causal Structures in Gauss-Bonnet gravity

Speaker: Keisuke Izumi (Nagoya University)

Place: Kenkyu Honkan 1F Meeting Room 3

Abstract:

The couplings with curvature in kinetic terms would arise as corrections from the quantum gravity theory, such as string theory. The curvature coupling in general makes the propagation to be superluminal. In the theory with superluminal modes, the causal analysis with null curves is meaningless, and thus the causal structures are nontrivial. Especially, we have to define black holes based on the fastest propagation.

In this talk, Gauss-Bonnet gravity will be discussed as the simplest model. We could say that in this model the kinetic term of graviton has the coupling with curvature. This model has the superluminal modes of graviton. However, we show the theorem; in stationary spacetimes, “horizon” defined by the null curve (i.e. in the usual way) becomes exactly the causal edge (i.e. the horizon in the sense of causality). Meanwhile, in dynamical spacetimes, the causal edge does not coincide with the “horizon” defined by null curves. Especially, in shrinking black hole spacetimes (by Hawking radiation), the gravitons can escape from the inside of “BH” defined by null curves.

Reference:

K. Izumi, Phys.Rev. D90 (2014) no.4, 044037