

Bures geodesics and quantum metrology

Friday, February 2, 2024 11:00 AM (1h 30m)

We study the geodesics on the manifold of mixed quantum states for the Bures metric. It is shown that these geodesics correspond to physical non-Markovian evolutions of the system coupled to an ancilla. Furthermore, we argue that geodesic evolutions are of interest in quantum metrology. In fact, if the unknown parameter is a phase shift proportional to the time parametrizing the geodesic, the estimation error obtained by processing the data of measurements on the system is equal to the smallest error that can be achieved from joint detections on the system and ancilla. This means that the ancilla does not carry any information on the parameter. The estimation error can saturate the Heisenberg bound. In addition, the measurement on the system bringing most information on the parameter is parameter-independent and can be determined in terms of the intersections of the geodesic with the boundary of quantum states.

The seminar will also be accessible online: <https://www.ihp.fr/en/live>

Its registration will be accessible (starting from the following week) on <https://www.carmin.tv/en/>

Presenter: SPEHNER, Dominique (Universidad de Concepcion, Chili)