

# Generalized Cotangent Geometry and Its Applications in Quantum Gravity

*Tuesday 8 July 2025 12:00 (20 minutes)*

One of the main challenges in theoretical physics is the unification of general relativity and quantum field theory, leading to the development of a consistent theory of quantum gravity. In this talk, we explore how the deformation of special relativistic kinematics can provide a framework to describe residual effects of quantum gravity at low energies. We analyze how introducing a curved momentum space allows for the formulation of a deformed relativistic kinematics and how this geometric construction can be extended to curved spacetimes through the formalism of generalized Hamilton spaces. We discuss the constraints imposed by observer invariance on momentum conservation, the natural emergence of noncommutative spacetimes, and the privileged role of Snyder kinematics within this geometric framework. Finally, we present the implications for developing an effective theory of quantum gravity at low energies.

## Working Group

WG1 - High Energy QG Theory

**Author:** Dr SANTAMARIA-SANZ, Lucia (Universidad de Burgos)

**Presenter:** Dr SANTAMARIA-SANZ, Lucia (Universidad de Burgos)

**Session Classification:** WG1 High Energy QG Theory 2