

20th International Summer School on Global Analysis and Applications  
General Relativity: 100 years after Hilbert  
Stará Lesná, Slovakia, 17th - 21st August 2015

Title: Some links between Lorentzian and Finslerian geometries

Miguel Sánchez (U. Granada)

Abstract:

There are two different natural links between Lorentzian and Finslerian geometries.

On the one hand, the causality of spacetimes can be computed from a Finslerian metric on its spacelike slices. This yields a purely geometric correspondence between relativistic elements (causality, gravitational lensing, causal boundaries) and Finslerian ones (non-symmetric distances, convexity and Busemann boundaries, resp.) Its applications include even the full description of non-relativistic Zermelo's navigation, i.e., to find the fastest trajectory between two points under a (possibly strong) wind.

On the other, some authors have considered the possibility to extend classical General Relativity to a Finsler-Lorentz setting, obtaining so a theory of modified gravity whose applications would include models of dark energy and quantum effects. This puts forward the development of a global Lorentz-Finsler Geometry.

A summary of these topics and prospective questions will be explained along the talk.