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## Extensions and limits of gravity in three dimensions

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## **Extensions and Limits of Gravity in Three Dimensions**

Lorena Parra, 16 October 2015

- Modifying General Relativity is a very challenging task since any new theory has to resolve the large scale problems while taking into account the behavior that arises in quantum theory.

Chapter 1

- In the massless limit, the linearized Supersymmetric New Massive Gravity suffers from a non-trivial coupling between a scalar and a current multiplet.

Chapter 3

- The Galilei limit is opposite to the Carroll limit. Geometrically, the non-relativistic transition can be considered as the opening of the light cones while the ultra-relativistic transition can be understood as the shrinking of the light cones.

Chapter 2

- The duality between the Galilei and Carroll algebras, relevant for the flat case, does not extend to the curved AdS case. Also, there is no duality in the supersymmetric cases.

Chapter 2

- It is possible to switch between non-relativistic backgrounds either by a partial gauging of symmetries or by gauge fixing some of the symmetries.

Chapter 4

- In flat Carroll superspace, the number of supersymmetries is not physically relevant.

Chapter 5

- The number of sunny days in the Netherlands is logarithmically proportional to the number of bikes in the country and inversely proportional to the number of varieties of tulips in its fields.

- He who walks with wolves will learn how to howl.