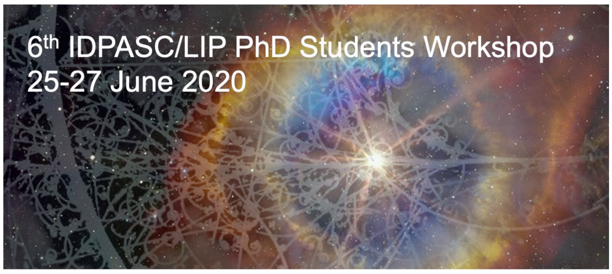

Contribution ID: **45** Type: **PhD student talk**

Cosmological and astrophysical applications of modified theories of gravity

Friday, 26 June 2020 11:50 (12 minutes)

In this work, we study cosmological and astrophysical applications of the recently proposed generalized hybrid metric-Palatini gravity theory, which combines features of both the metric and the Palatini approaches to the variational method in f(R) gravity. This theory arises as a natural generalization of the hybrid metric-Palatini gravity which has been proven to be the first theory to unify the cosmic acceleration with the solar system constraints, without resource to the chameleon mechanism.
In the cosmological point of view, we show using reconstruction methods that the usual power-law and exponential scale factor behaviors in FLRW universes exist for various different distributions of matter, along with solutions for collapsing universes. Using the dynamical system approach, we also show that no global attractors can exist in the cosmological phase space and that stable universes can either be described by scale factors that diverge in finite time or asymptotically approach constant values. Furthermore, we also study the cosmological phase space of theories of gravity with terms of order six and eight in the derivatives of the metric and we conclude that the higher-order terms are not neglectable.
In the area of astrophysics, we show that using the junction conditions of the theory it is possible to obtain solutions for compact objects supported by thin-shells, such as self-gravitating shells with and without perfect fluids on their exteriors, and also traversable wormhole solutions which satisfy the null energy condition for the whole spacetime, thus not needing the support of exotic matter. Furthermore, we show that there exist specific forms of the action for which the massive s

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