Probing gravity at cosmic scales

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Propositions accompanying the dissertation
"Probing Gravity at Cosmic Scales"

1. Conditions of theoretical stability should always be taken into account in a cosmological analysis, especially when the analysis involves phenomenological parametrizations.
   [Chapter 2]

2. Even with the current tight bound on the propagation speed of gravitational waves, there is room within Horndeski theory for non-trivial signatures of modified gravity at the level of linear perturbations.
   [Chapter 3]

3. The use of theoretical priors is essential for an entirely model-independent reconstruction of dark energy.
   [Chapter 3]

4. Within Horndeski theory it is possible to find models which are statistically favoured by the data over the standard cosmological model.
   [Chapter 4]

5. The effective field theory of dark energy and the phenomenological functions Σ and μ provide two complementary approaches to test gravity on cosmological scales: the former is directly linked to the theoretical stability, while the latter is connected to observations.
   [Pogosian & Silvestri Phys. Rev. D 94, 104014 (2016)]

6. The large amount of high precision cosmological data that we are expecting in the near future necessitates the development of efficient numerical codes. This is even more true when analysing modified gravity theories.
   [Bellini *et al.* Phys.Rev.D 97, 023520 (2018)]

7. The significance of what is known as the H_0 tension is too high to be explained by systematics: the more plausible solution is a beyond ΛCDM scenario.
   [Verde & Melville Nat. Astron. 3, 891-895 (2019)]

8. We are entering the era in which dark energy models in Horndeski theories can be tightly constrained by observations.
   [Kase & Tsujikawa Int. J. Mod. Phys. D28 (2019)]

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