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Kinetic screening and scalar radiation in K-Essence

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Regarding proposals for modified gravity theories, there is a popular class commonly denominated as scalar-tensor theories, where new scalar fields are introduced that do not interact with gravity in the standard fashion. There is a subclass of such theories that present Screening mechanisms, which allow them to modify gravitational phenomena at large scales while preserving General Relativity's predictions unaffected on smaller scales. This feature is essential since, so far (within the current precision of measurements), no deviations have been observed in gravitational wave observations, which constitute the small scale in this case. However, there are reasons to believe that puzzling phenomena at larger scales, like the accelerated cosmic expansion, can be explained with the use of scalar-tensor theories. This way, theories like the denominated K-essence are interesting since, in principle, they can modify gravity in the larger scales while leaving the smaller scales unaffected thanks to their Kinetic screening mechanism.
It is still unknown if such screening mechanisms hold in very dynamical scenarios, such as compact binaries. The nature of this theory makes it challenging to perform the simulations necessary to make such predictions in the nonlinear regime. Problems related to the loss of hyperbolicity and the separation of scales between the different relevant scales exacerbate this challenge.
In this talk, I will present the results of simulations carried out in a simplified scenario, allowing us to explore the nature of scalar radiation in K-essence theory in non-linear and very dynamical scenarios.

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