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Non-local gravity effects in galaxy cluster lensing

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Extended theories of gravity have been extensively investigated during the last thirty years, aiming at fixing the infrared and ultraviolet shortcomings of General Relativity and the associated Λ CDM cosmological model. Recently, non-local theories of gravity have drawn increasing attention due to their potential to ameliorate both the UV and IR behaviour of the gravitational interaction. Integral Kernel theories of Gravity indeed provide a viable mechanism to explain the late time cosmic acceleration as to avoid the introduction of any form of unknown dark energy. Moreover, these models represent a natural bridge towards quantum gravity. I will discuss a scalar-tensor equivalent of General Relativity corrected with non-local terms that have been selected via Noether symmetries. The main cosmological properties of the non-local model will be reviewed, and our detailed analysis of its features at galaxy cluster scales will be presented. We provide constraints on the non-local length scales and the Navarro–Frenk–White parameters through the comparison between the non-local theoretical predictions for the gravitational lensing, and the observations from the CLASH program.

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