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Cosmic Tsunamis in Modified Gravity: Disruption of Screening Mechanisms from Scalar Waves

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Extending general relativity by adding extra degrees of freedom is a popular approach for explaining the accelerated expansion of the Universe and to build high energy completions of the theory of gravity. The presence of such new degrees of freedom is, however, tightly constrained from several observations and experiments that aim to test general relativity in a wide range of scales. The viability of a given modified theory of gravity, therefore, strongly depends on the existence of a screening mechanism that suppresses the extra degrees of freedom. We perform simulations, and find that waves propagating in the new degrees of freedom can significantly impact the efficiency of some screening mechanisms, thereby threatening the viability of these modified gravity theories.

Presenter(s) : DAVID MOTA