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Positivity bounds and UV-IR relations in gravity and photon EFT

Sunday, 1 December 2024 14:50 (30)

Unitarity, causality, and Lorentz invariance of the fundamental theory are very constraining assumptions that are capable of building a link between low-energy EFT and its UV completion through the dispersion relations on scattering amplitudes. In this talk, I will consider the EFT of photons (or any other U(1) gauge field) and compare different approaches to obtain bounds on its Wilson coefficients. I will present an analytic derivation of the implications of unitarity (linear and non-linear positivity bounds) and compare these constraints with the requirement of causal propagation of the photon modes around non-trivial backgrounds generated by external sources. I will also discuss UV-IR relations implied by causality in graviton-mediated amplitudes. *The talk is based on my previous and ongoing work in collaboration with Claudia de Rham and other colleagues from Imperial College London.

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