Contribution ID: **2** Type: **not specified**

Bounds on effective theories of gravity

Friday 19 January 2024 14:30 (1 hour)

Modifications of Einstein's gravity can be systematically analyzed using the framework of effective field theory. In this setup, new physics is captured in a set of higher-dimension operators whose coefficients must be measured experimentally, or matched from a UV completion such as string theory. It has been known for some time that basic principles such as unitarity and causality impose constraints on the allowed values of such coefficients, but a systematic framework to explore these constraints has only recently emerged. In this talk I will review how developments in scattering amplitudes and the conformal bootstrap allowed us to compute sharp numerical bounds on these coefficients. Such bounds imply that gravitational interactions must shut off uniformly in the limit of vanishing Newton's constant, and prove the scaling with the cutoff expected from dimensional analysis. In addition they demonstrate that graviton scattering must remain weakly coupled at the scale where new higher-spin particles appear. Time permitting, I will comment on possible future applications of this set of ideas.

Presenter: PARRA MARTINEZ, Julio (British Columbia U.)