Contribution ID: **37** Type: **Talk**

Crossing the desert: Towards predictions for SMEFT coefficients from quantum gravity

The SMEFT provides a general framework to search for new physics beyond the current reach of direct detection. One such form of new physics is quantum gravity. Based on dimensional analysis, one would expect the prediction that the quantum-gravity contribution to the SMEFT coefficients is unmeasurably tiny at LHC scales. In this paper, we test this expectation in a specific framework for quantum gravity, namely the asymptotic safety framework. In this framework, Wilson coefficients can be calculated in relatively straightforward manner, making a connection between quantum gravity and LHC tests of the SMEFT achievable. We work in a toy model of the Standard Model fermion sector to investigate four-fermion couplings. We find three scenarios in this toy model, based on three distinct fixed points of the Renormalization Group flow. In the first scenario, the expectation from dimensional analysis is borne out and Wilson coefficients are Planck- scale suppressed. In the second and third scenarios, the Wilson coefficients are significantly larger than expected by dimensional analysis, due to interacting fixed points which generate an effective new-physics scale that lies between the LHC scale and the Planck scale. We comment on the implications of these results for the testability of asymptotically safe gravity within the SMEFT framework at the LHC.

Primary authors: CHIKKABALLI, Abhishek (NCBJ, Warsaw); Prof. EICHHORN, Astrid (University of Southern Denmark, Odense); Prof. BRENNER, Lydia (Nikhef, Amsterdam); Dr RAY, Shouryya (University of Southern Denmark, Odense)

Presenter: CHIKKABALLI, Abhishek (NCBJ, Warsaw)

Track Classification: Particle Physics [Early Career]