



Contribution ID: 115

Type: **Parallel Talk**

The f_{PS} / m_V and f_V / m_V ratios and the conformal window

Thursday, 3 August 2023 14:10 (20 minutes)

The mesonic f_{PS}/m_V and f_V/m_V ratios, with f the decay constant and m the meson mass, are calculated in mass perturbed conformal gauge theories to NNLO and N^3 LO orders, respectively. Here NNLO and N^3 LO refer to the non-relativistic effective theory expansion which is the applicable framework. The results are expanded a la Banks-Zaks in order to end up with scheme-independent predictions. These perturbative results are unambiguously reliable close to the upper end of the conformal window, $N_f = 16.5$ and it is shown that they might be reliable down to $N_f = 12$. An attempt is made to match these to previous non-perturbative lattice results in the range $2 \leq N_f \leq 10$ range. An abrupt change in the ratios is observed at around $N_f = 12 - 13$, which may signal the lower end of the conformal window.

Topical area

Particle Physics Beyond the Standard Model

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