Contribution ID: **37** Type: **not specified**

Systematic matching LEFT to ChPT for new physics studies

Thursday 24 July 2025 15:30 (45 minutes)

Various weak processes at the hadronic scale have been utilized to search for new physics at high energy scale, which can be described by the QCD chiral Lagrangian matched from the low-energy effective theory (LEFT). Utilizing the chiral symmetry SU(2)_L×SU(2)_R⟶SU(2)_V at the quark and hadronic levels, we make a comprehensive comparison of various matching methods, including the external source method, conventional spurion method, and our systematic spurion method. Although different methods show agreements for dimension-6 LEFT operator matching, we find that for higher-dimensional operators, the external source method is quite limited or inapplicable, the conventional spurion methods needs to introduce more and more spurions, while our spurion method does not need to introduce any new spurions than the ones in the dimension-6 matching. Using minimal set of spurions, we thus establish an one-to-one correspondence between the LEFT and chiral operators, with several examples, such as derivative operators at dimensions 7 and 8 with a single bilinear, four-quark operators at the dimension-9 level with two quark bilinears, which can be applied to the study of neutrino/electron scatterings and neutrinoless double beta decay.

Presenter: 李, 刚

Session Classification: Outlook