Contribution ID: **1172**   Type: **Parallel Talk**

Constraints on leptoquarks from lepton-flavour-violating tau-lepton processes

Thursday, 7 July 2022 14:30 (15 minutes)

Leptoquarks are ubiquitous in several extensions of the Standard Model and seem to be able to accommodate the universality-violation-driven B-meson-decay anomalies and the $(g-2)_\mu$ discrepancy interpreted as deviations from the Standard Model predictions. In addition, the search for lepton-flavour violation in the charged sector is, at present, a major research program that could also be facilitated by the dynamics generated by leptoquarks. In this work, we considered a rather wide framework of both scalar and vector leptoquarks as the generators of lepton-flavour violation in processes involving the tau lepton. We singled out its couplings to leptoquarks, thus breaking universality in the lepton sector, and we integrated out leptoquarks at tree level, generating the corresponding dimension-6 operators of the Standard Model Effective Field Theory. In the previous work of *T. Husek, K. Monsálvez-Pozo and J. Portolés* DOI: 10.1007/JHEP01(2021)059, we obtained model-independent bounds on the Wilson coefficients of those operators contributing to lepton-flavour-violating hadron tau decays and $\ell-\tau$ conversion in nuclei, with $\ell = e, \mu$. Hence, here we used those results to translate the bounds into the couplings of leptoquarks to the Standard Model fermions.

In-person participation

Yes

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Session Classification: Beyond the Standard Model

Track Classification: Beyond the Standard Model