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Type: Parallel talk

Connecting the $b \rightarrow s\ell\ell$ decays with dark sector in the light of scalar leptoquark \tilde{R}_2

Tuesday 15 October 2024 17:00 (15 minutes)

We make a correlative study of B-meson anomalies and fermionic dark matter in an extended standard model framework with $U(1)_{L_e-L_{\mu}}$ gauge symmetry. With three heavy neutral fermions and scalar double leptoquark \tilde{R}_2 , we realize the $b \to s$ transition. On top, an additional singlet spontaneously breaks the new U(1)and an inert scalar doublet to obtain neutrino mass at one loop. We then focus on the dark matter relic density and direct detection cross-section in scalar and gauge portals. The new physics contribution for $b \to s$ transition comes from penguin diagrams with Z', leptquark, and new fermions. We then constrain the model parameter space from the dark sector and also the well-established observables such as $Br(B_s \to \phi, K^{(*)})\mu\mu$ and P'_5 processes. Utilizing the allowed parameter space consistent with both sectors, we discuss the impact on several observables such as branching ratio, forward-backward asymmetry, and polarisation asymmetry. We also explore the lepton non-universality of $\Lambda_b \to \Lambda^*(1520)(\to pK)\ell\ell$ process.

Track type

Flavour Physics

Author: PANDA, Dhiren (UNIVERSITY OF HYDERABAD)

Co-authors: MOHAPATRA, Manas (University of Hyderabad); MOHANTA, Rukmani; SINGIRALA, Shivara-makrishna (School of physics, University of Hyderabad, Hyderabad 500046)

Presenter: PANDA, Dhiren (UNIVERSITY OF HYDERABAD)

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