Contribution ID: **86** Type: **Oral presentation using Zoom**

Probing then minimal $U(1)_X$ model at future electron-positron collider via fermion pair production

Wednesday, 27 October 2021 15:50 (20 minutes)

The minimal (1) extension of the Standard Model (SM) is a well-motivated new physics scenario, where the anomaly cancellation requirement dictates the new neutral gauge boson $(')$ couplings with the SM fermions in terms of two scalar charges (and $_{\Phi}$). In this paper, we investigate the SM charged fermion pair production mechanism for different values of these scalar charges in the (1) scenario at future electron-positron colliders, i.e. $^{+-} \rightarrow$. Apart from the standard photon and boson exchange for this process, this model features a -channel (or both and -channel for $=$ $^{-}$) $'$-boson exchange, which interferes with the SM processes. Considering the dilepton and dijet signatures from the heavy resonance we estimate the bounds on the $U(1)$ coupling $(')$ and the $'$ mass $(')$. Considering the LEP-II results and prospective International Linear Collider (ILC) bounds on the effective scale for the four fermion interaction we estimate the reach on $'/'$ for different center of mass energies. We study the angular distributions, forward-backward ($\mathcal{A}_{\rm FB}$), left-right ($\mathcal{A}_{\rm LR}$) and left-right forward-backward ($\mathcal{A}_{\rm LR,\ FB}$) asymmetries of the final states which can show substantial deviations from the SM results, even for a multi-TeV . This provides a powerful complementary way to probe the heavy $'$ parameter space beyond the direct reach of the Large Hadron Collider (LHC), as well as an effective way to determine the (1) charges.

1st preferred time slot for your oral presentation

13:00-15:00 JST (6:00-8:00 CEST, 0:00-2:00 EDT, 21:00-23:00 PDT)

2nd preferred time slot for your oral presentation

15:30-17:30 JST (8:30-10:30 CEST, 2:30-4:30 EDT, 23:30-1:30 PDT)

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