ILC Workshop on Potential Experiments

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  $\boxtimes$  boson exchange for this process, this model features a  $\boxtimes$ -channel (or both and -channel for = <sup>-</sup>) '-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  $_{\prime}/'$  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  $\boxtimes(1)$  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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Session Classification: H-2: BSM particle production

Track Classification: Parallel sessions: Topical Groups: Session H: BSM particle production