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Probing the minimal $U(1)_X$ model at future electron-positron colliders via the fermion pair-production channel

The general $U(1)_X$ extension of the Standard Model (SM) is a well motivated scenario which has a plenty of new physics options. Such a model is anomaly free which requires to add three generations of the SM singlet right-handed neutrinos (RHNs) which naturally generates the light neutrino masses by the seesaw mechanism. This offers interesting phenomenological aspects in the model. In addition to that the model is equipped with a beyond the SM (BSM) neutral gauge boson, Z' which interacts with the SM and BSM particles showing a variety of new physics driven signatures. After the anomaly cancellation the $U(1)_X$ charge of the particles are expressed in terms of the SM Higgs doublet and the SM Higgs singlet which allows us to study the interaction of the fermions with the Z'. In this paper we investigate the pair production mechanism of the different charged through the photon, Z and Z' boson exchange processes at the electron-positron (e^-e^+) . The angular distributions, forward-backward ($A_{\rm FB}$), left-right ($A_{\rm LR}$) and left-right forward-backward ($A_{\rm LR,FB}$) asymmetries of the different charged fermion pair productions show substantial deviation from the SM results.

Collaboration / Activity

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