

Associated Productions of HZZ and HHZ at Linear Colliders in Large Extra Dimension Model

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Abstract: In this paper we investigate the effects of the large extra dimensions on the two processes $e^+e^- \rightarrow H^0Z^0Z^0$ and $e^+e^- \rightarrow H^0Z^0Z^0$ at linear colliders in both unpolarized and polarized collision modes. We find that the virtual Kaluza-Klein graviton exchange can significantly enhance the cross section from their standard model expectations for these two processes. The results show that the LED effect on the process $e^+e^- \rightarrow H^0Z^0Z^0$ allows the observation limits on the effective scale M_S to be probed up to 9.75 TeV and 10.1 TeV in the unpolarized and $+(\lambda_{e^+}=1/2, \lambda_{e^-}=-1/2)$ polarized beam collision modes (with $P_{e^+}=0.6, P_{e^-}=0.8$), respectively. For the process $e^+e^- \rightarrow H^0Z^0Z^0$, these limits on M_S can be probed up to 6.06 TeV and 6.38 TeV in the unpolarized and polarized collision modes separately. We find that the $\lambda_{e^+}=1/2, \lambda_{e^-}=-1/2$ polarization collision mode in both process $e^+e^- \rightarrow H^0Z^0Z^0$ and $e^+e^- \rightarrow H^0Z^0Z^0$ may provide a possibility to improve the sensitivity in probing the LED effects.

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Key words: large extra dimensions, linear collider, Higgs boson, gauge boson

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