

Single Charged Top-Pion Production at the Next Generation e^+e^- Colliders

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Abstract: The single charged top-pion production processes $e^+e^- \rightarrow t\bar{b}\Pi_t^-$ and $e^+e^- \rightarrow W^+\Pi_t^-$ are studied in the framework of top-color-assisted technicolor (TC2) model. Our studies show that the cross section $\sigma(e^+e^- \rightarrow t\bar{b}\Pi_t^-)$ reaches the level of tens of fb and $\sigma(e^+e^- \rightarrow W^+\Pi_t^-)$ reaches the level of a few fb. With the yearly integrated luminosity of $L \sim 500 \text{ fb}^{-1}$ expected at the planned colliders, one could collect thousands of charged top-pion of events via the process $e^+e^- \rightarrow t\bar{b}\Pi_t^-$ and hundreds of events via the process $e^+e^- \rightarrow W^+\Pi_t^-$. The flavor changing decay mode $\Pi_t^- \rightarrow b\bar{c}$ is the best channel to detect charged top-pion due to the clean SM background. With a large number of events and the clean background, the charged top-pion should be observable at the planned colliders. Therefore, our studies in this paper can help us to search for charged top-pion, and furthermore, to test the TC2 model.

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Key words: top-pion, top-color-asisted technicolor model, linear colliders

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