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Title:	Study of $B \rightarrow (\chi c1 \gamma)K$ Decay in Belle II
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Abstract:	The thesis aims to perform a sensitivity study of the $B \rightarrow X(3823)K\pi$ in the Belle II data set. If $X(3823)$ is $\psi(1 3 D 2)$ state with $J P C = 2^{--}$, like $\chi c2$ ($J P C = 2^{++}$), its branching fraction of three body decay mode $B \rightarrow (\chi c1 \gamma)K\pi$ will be higher than its two body decay mode $B \rightarrow (\chi c1 \gamma)K$. We performed signal Monte Carlo study for the two and three body decay modes and estimated the reconstruction efficiency of $\psi(2S)$, $X(3823)$, and $X(3872)$. We improved the resolution of $M(\chi c1 \gamma)$ using the γ energy scaling by forcing ΔE to be zero. We planned to do the background study in order to estimate the sensitivity. Due to the current COVID-19 scenario, we could not complete this task. However, we do provide the expected signal efficiency for the decay mode of interest.
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