**Abstract**

The thesis aims to perform a sensitivity study of the B → X(3823)Kπ in the Belle II data set. If X(3823) is ψ(1 3 D 2 ) state with J P C = 2 −− , like χ c2 (J P C = 2 ++ ), its branching fraction of three body decay mode B → (χ c1 γ)Kπ will be higher than its two body decay mode B → (χ c1 γ)K. We performed signal Monte Carlo study for the two and three body decay modes and estimated the reconstruction efficiency of ψ(2S), X(3823), and X(3872). We improved the resolution of M (χ c1 γ) using the γ energy scaling by forcing ∆E 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.