XVIII International Conference on Hadron Spectroscopy and Structure (HADRON2019)



Contribution ID: 38

Type: Parallel

Effects of a triangle singularity on the production of $\Lambda(1405)$ through πp and pp reactions

Tuesday, 20 August 2019 11:30 (20 minutes)

In this work we study the effects of a triangle singularity in the cross sections of the $\pi p \rightarrow K^0 \pi \Sigma$ and $pp \rightarrow pK^*\pi\Sigma$ reactions. The triangle mechanism is generated the following way: the initial scattering creates the Nresonance that decays into $K\Sigma$, then, the Kdecays into πK and the π fuses with Σ to create the $\Lambda(1405)$. From this mechanism, a peak associated with the triangle singularity is expected to appear at $Minv(K\Lambda(1405))=2140$ MeV, but in fact appears at $Minv(K\Lambda(1405))=2100$ MeV, due to the presence of the resonance peak of the N. The position of the $\Lambda(1405)$ is also shifted bellow 1400 MeV in the invariant mass of $\pi\Sigma$, as is seen in the $pp \rightarrow p$ K* $\pi\Sigma$ HADES experiment.

[Based on Phys. Rev. C 97 035203 (2018)]

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Session Classification: Session 5: Analysis tools

Track Classification: Session 5: Analysis tools