Double resonance in Dalitz plot of $M(p\Lambda) - M(K\Lambda)$ in DISTO data on $p + p \rightarrow p + \Lambda + K^+$ at 2.85 GeV

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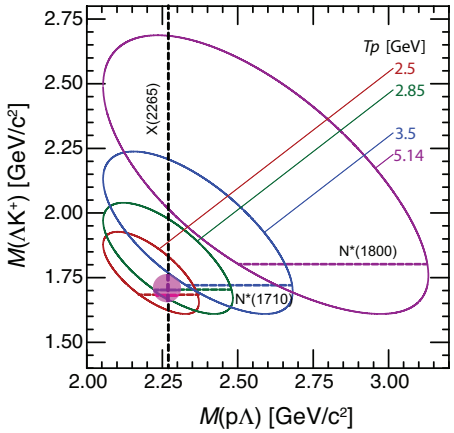
We report here further analyses of exclusive strangeness production reactions $pp \rightarrow pK^+\Lambda$ at bombarding energies of $T_p = 2.50$ GeV and 2.85 GeV performed by the DISTO collaboration at the SATURNE proton synchrotron in Saclay, France. This follows our previous publications [1, 2]. At $T_p = 2.85$ GeV the K^+ missing mass and $p\Lambda$ invariant mass spectra for high transverse momenta of p and K^+ revealed a broad resonance $X(2265)$ of 26-σ confidence with a mass $M_X = 2267 \pm 3(\text{stat}) \pm 5(\text{syst})$ MeV/c^2 and a width $\Gamma_X = 118 \pm 8(\text{stat}) \pm 10(\text{syst})$ MeV. The cross section for $pp \rightarrow K^+X(2265)$ was determined to be $3.9 \pm 0.9\mu$b, which turned out to be comparable with that for the production of the $\Lambda(1405)$ resonance, supporting the mechanism of high sticking of $\Lambda(1405) + p$ in forming a dense K^-pp resonance [3]. In addition we have observed a double resonance structure in the ΛK^+ *vs* $p\Lambda$ Dalitz plot; the ΛK^+ invariant mass spectrum is enhanced at around 1.70 GeV/c^2 indicating that the $N^*(1710)$ resonance with a decay branch to ΛK^+ plays an important role in the formation of the $X(2265)$ resonance. It is to be noted that this "double resonance" enhancement zone observed at $T_p = 2.85$ GeV cannot be populated at higher incident energy such as 3.50 GeV. This may explain why the HADES experiment [4] at 3.50 GeV did not observe the same double-resonant X.



References

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