

Search for the kaonic bound state ppK^- in $pp \rightarrow pK^+\Lambda$

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The investigation of the kaon-nucleon interaction currently has been intensified in the last years due to new measurements of the $\Lambda(1405)$ and indications on the existence of the $\bar{K}N$ - bound state. Such results are heavily discussed since they can lead to new knowledge about the Antikaon-Nucleon interaction.

The reaction $pp \rightarrow pK^+\Lambda$ In the last years this reaction has been measured at the GSI-Darmstadt with the FOPI and the HADES Spectrometer at beam energies of 3.1 GeV and 3.5 GeV, respectively. New analysis methods have been developed in our group to understand quantitatively all the processes contributing to the $pK^+\Lambda$ final state and a statistics of around 1000 and 20000 exclusively measured events has been collected

with the FOPI and the HADES spectrometer, respectively. At the FOPI experiment a set of around 1.000 events and in the HADES experiment

around 20.000 events of these exclusive reaction $\bar{K}N \rightarrow \bar{K}N + \Lambda$ could be extracted.

These reconstructed exclusive events were analyzed within the Bonn Gatchina Partial Wave Analysis framework, which provides a coherent

solution including several resonant and non-resonant production channels. The results have shown, that the inclusion of interferences between

different channels is an important effect, which has to be considered in the analysis.

Based on the description of the Partial Wave Analysis an upper limit for the cross-section for the production of the $\bar{K}N$ - could be determined.

In this talk the analysis method of the Partial Wave Analysis as well as the results for the contribution of different production channels and the upper limit for the $\bar{K}N$ - will be shown.

Furthermore a strategy for a future analysis project based on the Partial Wave Analysis for different beam energies will be presented.

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