

Search for the kaonic bound state ppK^- in $pp \rightarrow pK^+\Lambda$ final state using Partial Wave Analysis

Robert Münzer¹ for the FOPI and HADES Collaboration

¹Excellence Cluster Universe - Technical University Munich
Boltzmannstr. 2 85478 Garching, Germany

The investigation of the kaon-nucleon interaction has been intensified in the last years especially trying to interpret some contradicting results on the existence of the ppK^- bound state. Such results are heavily discussed since they can lead to new knowledge about the \bar{K} -N interaction. In the last years the reaction $pp \rightarrow pK^+\Lambda$ has been measured at the GSI with the FOPI and the HADES spectrometers at beam energies of 3.1 GeV and 3.5 GeV, respectively. The reconstructed exclusive events were analyzed within the Bonn Gatchina PWA framework, which provides a coherent solution including several resonant and non-resonant production channels. This analysis allowed the extraction of an upper limit for the cross-section for the coherent production of the ppK^- .

Based on these results, a more general analysis extended to also other measurements of the same final state is currently going on. The goal of this analysis is to provide a solid understanding of the production mechanism of the underlying reaction by exploiting all the measurements of the reaction $p + p \rightarrow p + K^+ + \Lambda$ available at this time. For the analysis the excitation function of different contribution N^{+*} resonance can be extracted, as well as the excitation function of the Σ -N cusp effect, which also provides interesting insights to the coupling of strange and non-strange baryons. A solid understanding of the production mechanism allows also a further determination of the contribution of the ppK^- .

In this talk the analysis method of the PWA, the extracted value for the ppK^- and the results from the ongoing combined analysis will be shown.