Final State Interactions and Polarization Observables in the Reaction $pp \rightarrow pK^+\Lambda$

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Due to the lack of high quality hyperon beams final state interactions in hyperon production reactions are a compelling tool to study hyperon nucleon interactions. A method has been proposed\cite{1} to determine the spin triplet $p\Lambda$ scattering length with a polarized proton beam. The COSY-TOF experiment has recently been upgraded in order to reconstruct the $pK^+\Lambda$ final state with sufficient precision for this analysis. However, we find an unexpected behavior of the $K^+$ analyzing power which spoils the extraction method with the available statistics. A theoretical explanation is pending.

Furthermore, the polarized beam together with the self analyzing decay of the $\Lambda$ allows us to determine the $\Lambda$ depolarization. This is especially sensitive to $K^+$ and $\pi$ exchange in the production mechanism. Our finding verifies, to a large extent, the result from DISTO that has so far been the only measurement close to the production threshold.


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