

Investigating In-medium Lambda Production in Pion Induced Reactions

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One of the central questions in studying the characteristic of nuclear matter for both, experiment and theory, is the presence of in-medium effects which manifest in the change of hadron properties. Strange particles are essential probes to study in-medium effects of hadrons produced in collisions between nuclei at energies close to the respective nucleon-nucleon production thresholds.

The direct method to investigate the threshold behaviour is the use of pion beams to study the reactions like $\pi + N \rightarrow Y + K$, involving a Y hyperon and K meson.

The experiment with secondary pion beam was performed by the FOPI collaboration at the GSI using C, Al, Cu, Sn and Pb nuclear targets at beam momentum of 1.15 GeV/c. The FOPI system is assembled at the SIS accelerator, covering complete range of beam energies (0.1 to 2.0 GeV per nucleon) and nearly full solid angle. The main goal of that experiment was to measure the in-medium cross section of the reaction $\pi^- + p \rightarrow \Lambda + K^0$.

The in-medium inclusive cross section for the production of K^0 mesons has been evaluated and published by M. L. Benabderrahmane et al., Phys. Rev. Lett. 102 (2009) 182501.

We have worked on the investigation of inclusive Lambda production and we plan to determine a statistical limit on correlated Lambda and K^0 pairs. In order to find modifications of hadronic properties, it is also necessary to do the detailed comparison with theoretical model predictions.

Considering already obtained results and our analysis, the expectations for Lambda particle will be pointed out in this work.

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