

Production and decays of hyperons in p+p reactions measured with HADES

Friday, 23 June 2023 18:10 (20 minutes)

Within the framework of the quark model, hyperon states are composed of “u” (up) and “d” (down) “s” (strange) quarks. However, there are also competing models describing excited hyperons as dynamically generated by meson- baryon interactions. Prominent examples are $\Lambda(1520)$ [1] and $\Lambda(1405)$ [2]. In order to discriminate between models, it is helpful to measure hadronic decays, e.g. $\Lambda(1520) \rightarrow \Sigma^+(1385)\pi^-$, $\Lambda(1520) \rightarrow Kp$, $\Lambda(1405) \rightarrow \Sigma\pi$

In this presentation, a study of the inclusive production and decays of $\Sigma^+(1385) \rightarrow \Lambda\pi^+$ and $\Lambda(1520) \rightarrow \Lambda\pi^+\pi^-$ hyperons produced in proton-proton reactions at beam energies of 3.5 and 4.5 GeV with HADES detector at FAIR will be presented [3]. Particular attention will be put on application of machine learning methods for Λ identification in HADES, specifically utilizing multilayer perceptron neural networks, and the so-called Classification Without Labels method. The preliminary analysis results from 4.5 GeV data will be presented and compared to the results from the former experiment at 3.5 GeV.

[1] M. Kaskulov and E. Oset, Phys. Rev. C73(2006) 045213

[2] N. Kaiser, P.B. Siegel, and W. Weise, Nucl. Phys. A594 (1995) 325; E. Oset and A. Ramos, Nucl. Phys. A635 (1998) 99;

[3] J. Adamczewski-Musch et. al. (HADES Collaboration) Eur. Phys. J. A (2021) 57: 138

Collaboration

HADES

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Session Classification: Parallel session C4